NETWORK WORLD

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

AN INTERNATIONAL DATA GROUP PUBLICATION ◆ VOLUME 11, NUMBER 42 ◆ OCTOBER 17, 1994

Get back to reality! New column on page 89.

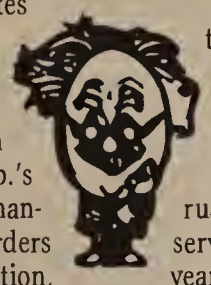
EMERGING APPLICATIONS

Egghead thinks Network Notes will deliver the goods

BY BILL BURCH

Issaquah, Wash.

Software reseller Egghead, Inc. this week will be one of the first companies to take AT&T's Network Notes groupware service out for a spin.



Egghead plans to use the service, which is based on Lotus Development Corp.'s Notes, as an electronic sales channel over which it will take orders from customers across the nation, according to Bryan Williams, director of value-added services.

"We're looking to make the connection to either a customer or a vendor as simple as possible," Williams said. "Network Notes seems to fit that objective."

Egghead — one of 10 companies taking part in AT&T's market trial of Network Notes — will be loading its applications onto the servers this week. Plans call for the trial to run through mid-February; AT&T expects to launch the service by the first quarter of next year.

Network managers at Egghead have already built much of the compa-

See **Egghead**, *page 87*

Cisco gets virtual with its new Synergy switch

Router maker takes the internetworking battle to the border.

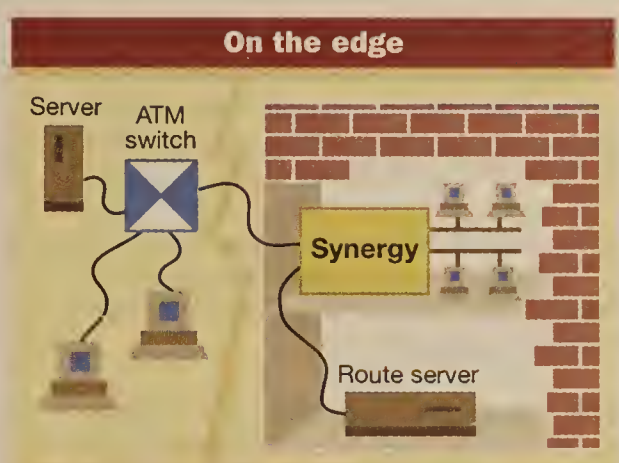
BY SKIP MACASKILL

San Jose, Calif.

Cisco Systems, Inc. is prepping a new version of its Catalyst switching hub, code-named Synergy, that will give traditional LANs access to Asynchronous Transfer Mode nets, as well as help users establish and route traffic among virtual LANs.

Synergy is a key piece of the CiscoFusion architecture, which addresses how users can migrate from shared-media LAN internetworks to switched networks. "This involves moving local routing capabilities into intelligent LAN switches," said Melinda Le Baron, program director at Gartner Group, Inc., a consultancy based in Stamford, Conn.

"It will also allow Cisco to take on some smaller companies that are leading the charge in the LAN-to-ATM market," she added. Those companies include start-ups such as Agile Networks, Inc., NetEdge Systems, Inc. and Xylan Corp.



Cisco's new Synergy border device can provide local routing within a collapsed backbone or give traditional LAN users direct access to ATM switch-based nets.

GRAPHIC BY SUSAN SLATER

Synergy, to be announced in the first half of 1995, will be an intelligent chassis-based device for collapsed backbone environments that can switch traffic at Layer 2 between workgroup users. It will also allow users to create virtual LANs and locally route packets between those segments via Cisco's Virtual Network Services (VNS). In the initial release, users will only be able to

See **Synergy**, *page 86*

Venture capitalists sow the seeds of future nets

BY MICHAEL CSENGER AND SKIP MACASKILL

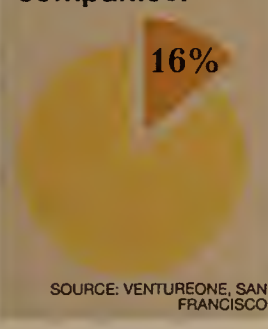
Venture capitalists are the network industry's version of Johnny Appleseed.

From the pockets of venture capital firms, or VCs — crowded mainly in Boston, New York and the Silicon Valley — come the funds from which sprout new companies with innovative technologies that may or may not survive in user nets.

Simply put, venture capital drives information technology. Nearly every major player in the most important networking markets had its start not long ago in the coffers of a few VCs.

Over the past 10 years, VCs have provided the seed dough for the companies that deliver the key components of enterprise nets: routers, muxes, switches and the like. And today, they are fueling new start-ups with Internet-based, wireless and other offerings that will define the networks of tomorrow.

Of the $4.2 billion in private equity financing obtained by venture-backed firms last year, nearly $700 million went to communications and networking companies.



SOURCE: VENTUREONE, SAN FRANCISCO

But users don't often lay eyes on these VCs, companies like Accel Partners, Battery Ventures, Matrix Partners, Menlo Ventures and Sutter Hill Ventures. They are surprisingly quiet despite the fact that the top 15 to 20 firms focused on information technology have a total purse of nearly $7.5 billion (see graphic, page 10).

Venture capital plays a key role in product development and reengineering because mature, established vendors don't

See **Capital**, *page 10*

Lotus gets smart: Bundles Notes and desktop apps

BY KEVIN FOGARTY

Cambridge, Mass.

Lotus Development Corp. this week is expected to bundle Notes software with its SmartSuite set of desktop applications and sell the package at a discount of almost 20%, according to sources familiar with the plan.

The move is a direct attack on rival Microsoft Corp., which leads the desktop suite market with its Microsoft Office and plans to take on Lotus in the groupware market when it releases its Exchange product next year.

The offer is intended to make standardizing on the SmartSuite desktop products more attractive to large Notes users, companies with big Lotus desktop installations and those that have not standardized on either groupware or desktop products, according to analysts.

Lotus customers, however, are not so easily sold.

"We've got 600 PCs with Windows and Microsoft Office standard," said Steve Riley, systems analyst for Ash-

See **Lotus**, *page 6*

IBM Warps the network

Network-rich OS/2 versions on tap.

BY PEGGY WATT

New York

In an effort to head off Microsoft Corp.'s Windows NT and Windows95 operating systems, IBM is readying both client and server editions of its new OS/2 Warp desktop operating system that add new connectivity features.

The OS/2 Warp LAN Server Connectivity Solution, scheduled to ship next year, includes IBM LAN Server 4.X plus all the features of OS/2 Warp Version 3.0.

The product also contains both the client and server portions of LAN Distance, an existing IBM product that lets remote users dial in to IBM LAN Server networks and operate as if locally attached. Another com-

See **IBM**, *page86*

Communications comparison

IBM OS/2 Warp LAN Client Connectivity Solution 3.0		Microsoft Windows NT Workstation 3.5
• TCP/IP support	VS.	• Client service for NetWare and Unix
• Internet access		• TCP/IP and IPX/SPX transport stacks
• LAN Distance remote access		
• LAN Server Requestor		**Microsoft Windows NT Server 3.5**
• NetWare Requestor		• Gateway service for NetWare
• Systems Performance Monitor		• TCP/IP and IPX/SPX transport stacks
IBM OS/2 Warp LAN Server Connectivity Solution 3.0		• Point-to-Point Protocol and SLIP support
• LAN Server		
• TCP/IP support		
• Internet access		
• LAN Distance remote access		
• Systems Performance Monitor		

NEWSPAPER $5.00

Briefs

Familiar ring. Hoping to offset the momentum Ethernet switching has been enjoying as of late, IBM, 3Com Corp. and Madge Networks, Inc. next week will form a token-ring industry alliance. The group will highlight token ring's strengths, including recently introduced full-duplex and switching features. Six years ago, IBM thumbed its nose at the Open Token Foundation — a multivendor organization to promote interoperability of token-ring products — because Big Blue knew it could dictate and others would follow. That group ultimately failed because IBM refused to participate.

MCI's wireless maneuvering. MCI Communications Corp.'s enigmatic wireless strategy took another twist last week when reports surfaced that the carrier is the latest to hold serious talks with Bell Atlantic Mobile Systems, Inc. (BAMS) and NYNEX Mobile Communications about joining the merged BAMS/NYNEX wireless team. The reports, which MCI would not confirm, come weeks after the collapse of MCI's plan to invest heartily in specialized mobile radio company Nextel Communications, Inc. as its way to bring digital two-way wireless services to market.

Messaging muscle. The X.400 Application Program Interface Association (XAPIA) last week announced that it will greatly enhance its Common Messaging Calls (CMC) electronic mail application program interface in early 1995 to help users route messages more easily. The XAPIA is also looking to add CMC hooks to fax, voice and electronic data interchange systems, and at possibly building a new API for linking proprietary E-mail directories. The announcements were made at the Electronic Messaging Association's first Leadership Conference held in Washington, D.C. last week.

IBM takes aim at ATM. As expected, IBM this week will announce the ATM backplane upgrade, ATM switch module and ATM interface modules for linking workstations and servers for its 8260 Intelligent LAN Hub (*NW,* June 27). The backplane and workstation adapters are expected to ship by December and the ATM switch module in March 1995.

No cost compatibility. Microsoft Corp. last week said it would make the core networking technology of Windows95 available to other network operating system software companies at no cost.

The company said its Windows95 network Virtual Device Driver source code will help improve multivendor network interoperability, performance and network reliability. The company already provides no-cost licenses to Artisoft, Inc., Banyan Systems, Inc., Digital Equipment Corp., Novell, Inc. and Sun Microsystems, Inc.

Plastics in a box. GE Plastics, a division of the General Electric Co., is not just setting up a World-Wide Web (WWW) server on the Internet; it's giving customers the software they need to access it. The company will distribute a modified version of Spry, Inc.'s Internet in a Box software that features an icon that users can click on to be directly connected to its WWW server, which will feature information on company services and products. Spry said this is the first of a new line of branded versions of its software.

Test bed time. Sprint Corp. and several major equipment vendors this week will unveil a private 150-mile Synchronous Optical Network ring called the Silicon Valley Test Track, centered at Sprint's Advanced Technology Laboratory in Burlingame, Calif. Participants will demonstrate not only the broadband applications found in many Asynchronous Transfer Mode test beds, but also key end-user operational benefits such as electronic provisioning of T-1 and T-3 circuits from customer sites, according to Sprint officials. Participating vendors include Digital Equipment Corp., Hewlett-Packard Co., Sun Microsystems, Inc., Xerox Corp. and others.

Ch-a-a-arge it! AT&T's Tridom satellite subsidiary last week said it has upgraded the hardware and software components of its Skynet MallSat Service — a wireless credit card authorization service for retailers — to whittle response times down to as low as 4 seconds. The company also said it has signed a multiyear contract with CompUSA to launch a business satellite net for the computer retailer that includes two-way videoconferencing and broadcast video services for training, marketing and other applications.

For details on how to reach us, see page 89.

Table of Contents

NEWS

Frame relay is quickly gaining industry acceptance as it becomes more and more reliable. *Page 4.*

Groupware newcomers try to capitalize on competitors' delays. *Page 4.*

The DMTF pulls up a chair for users with its newly formed advisory group. *Page 4.*

NetWare WAN performance improvements inch closer with Novell's shipment of NLSP. *Page 6.*

New Isocor softwares are aimed at enterprise E-mail. *Page 7*

Intel-led industry group shows off LAN-to-WAN video and data-sharing at TeleCon show. *Page 7.*

Database vendors eye OpenDoc for new access tools. *Page 14.*

CDPD proponents try to convince potential wireless application programmers that the service deserves their attention. *Page 14.*

IBM is using teamwork to drive APPN technology. *Page 14.*

ENTERPRISE INTERNETWORKS

Cisco is the first to make the mainframe a full-fledged member of the internetworked enterprise. *Page 19.*

CommVision's communications servers integrate LAN/WAN data needs. *Page 19.*

LAN WORLD

Grand Junction is first out of the gate with a fast Ethernet repeater. *Page L1.*

Vendors offer border devices for LAN switching and ATM support. *Page L1.*

WUGNET: Internet access and PCI-based hardware issues heat up. *Page L8.*

GLOBAL SERVICES

Resellers may offer greatly reduced rates to the U.K. market. *Page 35.*

If you're waiting for universal availability of ISDN lines to launch a telecommuting program, don't hold your breath. *Page 35.*

CLIENT/SERVER APPLICATIONS

Oracle Documents impresses beta users with its text retrieval feature. *Page 43.*

InterCon fuels its products with Pipeline software. *Page 43.*

OPINIONS

Scott Bradner on the view from Mexico. *Page 26.*

Mark Gibbs on user interfaces. *Page L19.*

Eric Paulak on the local calling area's size. *Page 40.*

Editorial on LAN-based video. *Page 50.*

James Kobielus on interactive TV. *Page 50.*

Andy Ludwick and Luke McCormack give their takes on the SynOptics/Wellfleet deal. *Page 51.*

Letters. *Page 52.*

Back to Reality: IBM waves a Karat. *Page 89.*

CyberSpeak. *Page 89.*

BUYER'S GUIDE

Anyone looking for a network management platform will find vendors busily retooling their products to support distributed processing and tighter application integration.

Page 55.

Network HELP desk

Network World *tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-1103 or (508) 820-3467, via the Internet at djt@world.std.com or via CompuServe at 73244,2673.*

I am thinking about getting a Serial Line Internet Protocol (SLIP)/Point-to-Point Protocol connection to the Internet for my company. Do you know of any providers in Arkansas or surrounding states that support 28.8K bit/sec connections?
Ira Harris, Pine Bluff, Ark.

NW found one Internet service provider in Arkansas that provides SLIP and PPP connections — Sibylline, Inc. They currently support 28.8K bit/sec connections.

For more information about Sibylline services, call (501) 521-4660 or send E-mail to info@sibylline.com.

Otherwise, you may want to check out some of the Texas-based Internet service providers that provide SLIP and PPP access, such as NeoSoft, Inc. in Houston or Freeside Communications, Inc. in Austin. NeoSoft currently supports 28.8K bit/sec connections, and Freeside Communications plans to support 28.8K bit/sec by November. For more information, call NeoSoft at (800) 438-6367 and Freeside Communications at (512) 339-6094.

Readers can find an up-to-date listing of Internet providers on the Internet by accessing the Internet Network Information Center (InterNIC) server. To access the InterNIC database, use Gopher to connect to is.internic.net. Choose Option 3 (InterNIC Directory and Database Services) and then Option 2 (InterNIC Directory of Directories). Next, select Option 5 (Search by Keywords), and type in keywords, such as SLIP or PPP, to narrow the search for service providers.

Readers can also access a list of Internet service providers indexed by area code via anonymous FTP at is.internic.net in the infoguide/getting-connected/united-states directory. The file is called internic-us-provider-all.

For more information about Internet service providers, contact the InterNIC Reference Desk by calling (619) 455-4600, via fax at (619) 455-4640 or via the Internet at refdesk@is.internic.net.

Another option for finding an Internet access

See **Help desk**, *page 53*

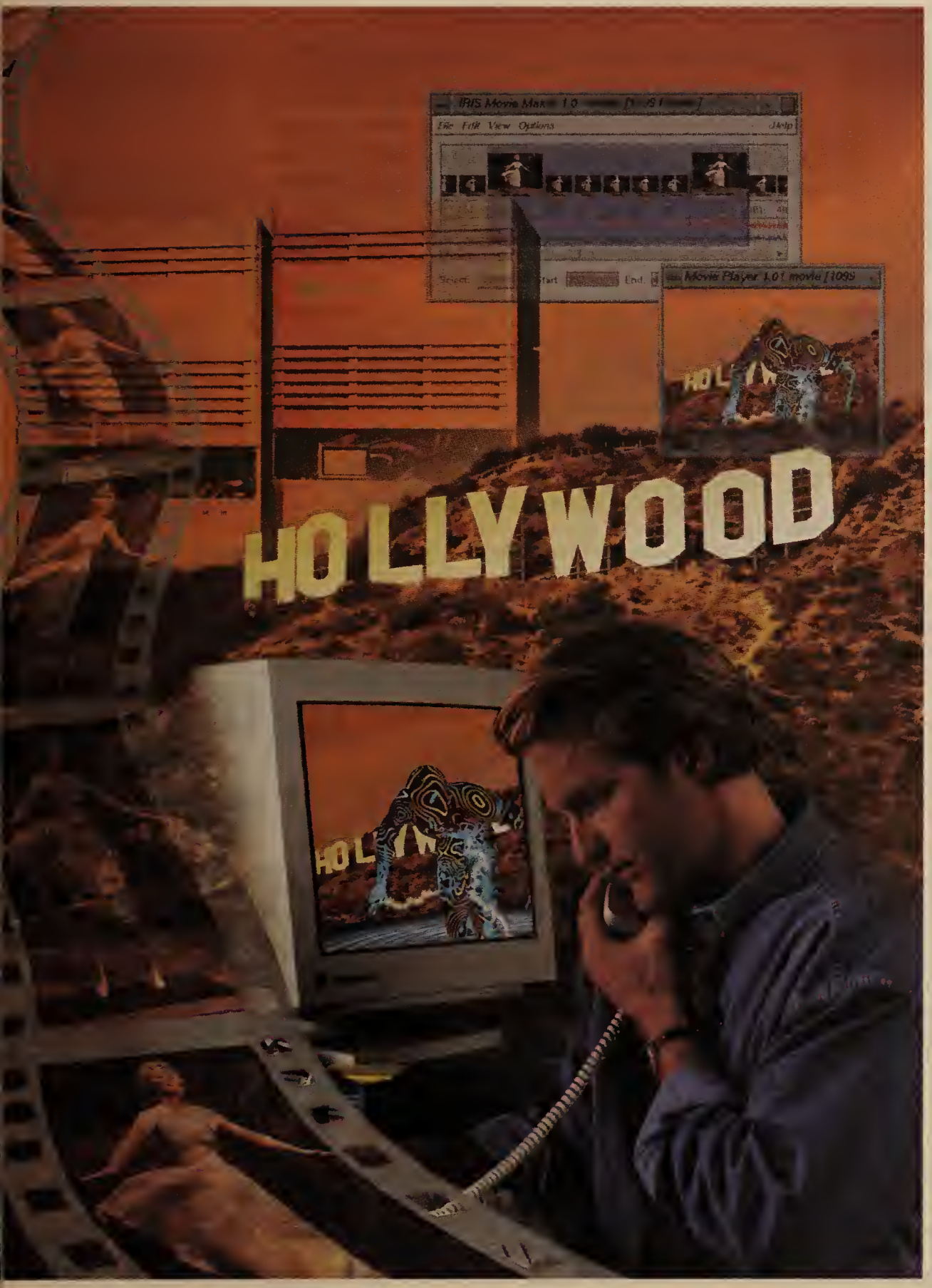
12 locations.

130 special effects.

300,000 feet of film.

A $50 million budget.

And one extraordinary company behind the scenes.



Sprint Technology Has Tinseltown Talking.

It takes a company with vision, energy and unsurpassed technology to spark a communications breakthrough in the world's most creative industry.

The company is Sprint, which has teamed with Silicon Graphics Computer Systems in an astonishing new production and broadcast network.

Sprint ATM and TCP/IP technology will link Silicon Graphics' Silicon Studio™ production environments from coast to coast. This new network has been called the first private data superhighway for transmitting digital film, video and interactive media instantaneously.

Which means a film editor in L.A. can collaborate with a sound designer in New York and a special effects producer in Boulder in real time. Without the costs, delays and risks of shipping actual footage.

The same Sprint breakthroughs that are revolutionizing Hollywood can do the same for your business. By giving you real communications solutions that get real results.

Now, if we can do that for Hollywood, imagine what we can do for your business.

Call 1-800-669-4700 to find out more.

Sprint. Business

© 1994 Sprint Communications Company L.P.
Silicon Graphics, IRIS, and the Silicon Graphics logo are registered trademarks, and Silicon Studio and Showcase are trademarks of Silicon Graphics, Inc. The Hollywood sign, a trademark of the Hollywood Chamber of Commerce, is used with permission.

© 1994 The Estate of Marilyn Monroe. All Rights Reserved. Marilyn™, & MARILYN™, and NORMA JEANE are trademarks of the Estate of Marilyn Monroe. Represented by The Roger Richman Agency, Inc., Beverly Hills, CA.

DMTF gets closer to customers

Management consortium forms user advisory group.

BY MICHAEL COONEY

Boca Raton, Fla.

In the first major show of product force, more than 30 vendors last week either demonstrated or announced products supporting the Desktop Management Task Force's (DMTF) specifications for managing networked PCs.

The broad display of support from such players as IBM and Novell, Inc. was a major boost for the Desktop Management Interface (DMI) and brings DMTF closer to its promise of simplifying and enriching management of desktop systems.

In addition to showcasing its backer's offerings, the DMTF also announced at its developers conference that it has formed a user advisory group that will steer future DMI developments.

"We like the fact that vendors are coming to us for direction on this," said Arnold Howard, senior personal computer LAN analyst with John Hancock Financial Services in Boston. "Once the products that were demonstrated at this meeting begin to ship, we expect there will be rapid [adoption] of DMI in the user community."

DMI code is built into PC operating systems and other products to let users pull a variety of systems information, such as available disk space or configuration data, from desktop devices and peripherals. Data gathered via the DMI is stored on the desktop in a Management Information File, which maps the data to any standard management platform.

One of the most far-reaching announcements at

See **DMTF**, *page 86*

New groupware entries to fill market voids

BY KEVIN FOGARTY

Newton, Mass.

A few of the new players in the groupware market are beefing up their products in an attempt to take advantage of a lull in action by some of the industry's leading players.

Lotus Development Corp., Microsoft Corp. and IBM have whetted the appetites of users for new technology by promising next-generation products, but they will not deliver on those promises for three to nine months.

In fact, Microsoft, whose Exchange product is the highest profile of the upcoming groupware flock, has been deemphasizing Exchange because of delays in getting to market, according to industry sources.

Coming attractions

Mesa's Conference+

- Will feature bidirectional replication with Notes databases.
- Will allow bulletin board synchronization with Internet Usenet groups.
- Will include a Universal Mail Agent, allowing non-Conference+ users to join Conference+ discussions via E-mail.

Collabra's Collabra Share

- Adding a replication engine.

Microsoft has switched its attention from Exchange, which Chairman Bill Gates said last June would be Microsoft's most important product since Windows 3.0, to BackOffice, a suite of server-based applications that will eventually include Exchange.

Microsoft also shifted Todd Warren, the group product manager who was primarily responsible for rolling out Exchange, to a similar role in the production of BackOffice, leaving Exchange responsibility with Greg Levin, one of Warren's top lieutenants.

Microsoft has also been appeasing impatient users by actively promoting conferencing products from Collabra Software, Inc. and The Mesa Group, Inc.

But Mesa and Collabra hope to take that a step further by stepping into the gap and adding many of the features promised by the industry giants.

Mesa next month will release add-on technology called Interchange that will let its conferencing application replicate discussion databases directly from the Internet and from Lotus' Notes. It will also release a Universal Mail Agent that will let users that do not have its Conference+ product to join group discussions by electronic mail or fax.

Mesa is also quietly offering a utility that will boost its market and Microsoft Mail's installed base by converting mailboxes in Lotus' cc:Mail to Microsoft Mail automatically. The utility is an important installation tool for Mesa, whose Conference+ product runs only on Microsoft Mail.

Mesa does not promote the unnamed utility and offers it as a service through its conference group, rather than as a stand-alone product in a box, to avoid offending Lotus, with which it has a close relationship, according to Mesa officials.

It converts remote and gateway addresses, Object Linking and Embedding (OLE) objects, all cc:Mail text items such as stored mail, all attachments, and all sender and recipient header fields to Microsoft Mail addresses. It also puts cc:Mail folders in the Microsoft Mail message store.

The utility and the Interchange products greatly expand the reach and appeal of Conference+, said Tom Austin, analyst at Stamford, Conn.-based consultancy Gartner Group, Inc.

Interchange is a gateway between document databases that exchanges information and messages in exactly the same way as gateways do between E-mail systems, Austin said.

The three products are also a way for Mesa, which has been dismissed as limited by users and analysts because it runs only on Microsoft Mail, to get some respect.

Competitors such as Collabra and Trax Softworks, Inc. both use Microsoft's Messaging Application Programming Interface and Lotus' Vendor Independent Messaging as transport protocols. And they also and use their own user interfaces, rather than Microsoft Mail's, as Mesa does.

With the new additions, Conference+ will offer the lion's share of the features Microsoft has promised for Exchange, Austin said. It will lack some features, such as OLE 2.0 support, but is otherwise a good stopgap for users waiting for Exchange, Austin said.

Prices for the Interchange products and the cc:Mail conversion utility were not available.

Collabra, meanwhile, announced last week that it will add the ability to replicate discussion databases from its Collabra Share product throughout a network and via E-mail to remote users.

The replication engine will ship as an update Oct. 14, and it will come as a free upgrade to Collabra Share's Enterprise Extension, according to David Jones, vice president of marketing. The replication engine ships updates to network servers via E-mail and includes the ability to track and resend replication messages that are not delivered.

✆Mesa: (617) 964-7400; Collabra: (415) 940-6429.

Frame relay gaining user acceptance, new features

BY BILL BURCH AND DAVID ROHDE

Washington, D.C.

Frame relay is rapidly developing broad industry support as businesses gain confidence in its reliability, and enhancements this fall should make it even more attractive.

"You're seeing a lot of businesses willing to put their critical applications onto frame relay," said Bob Lee, Pacific Bell's frame relay product manager. "People are no longer seeing it as kind of a trial technology."

Local and long-distance carriers are working to enhance frame relay technology by testing Network-to-Network Interface (NNI). Until now, the two camps had interconnected their networks via User-to-Network Interfaces that did not allow end-to-end supervision of permanent virtual circuits (PVC).

"You're seeing a lot of businesses willing to put their critical applications onto frame relay. People are no longer seeing it as kind of a trial technology."

Among the regional Bell holding companies, Ameritech Corp., Pacific Bell, SBC Communications, Inc., and US WEST, Inc. all support NNI. BellSouth Corp. is in the process of filing for the NNI, and NYNEX Corp. plans to have the connection up next year.

The next step for the local carriers will be mutual certification with NNI long-distance carriers. That certification requires that carriers have not only reached agreements on the technical interconnections, but also on operational issues of setting up PVCs across networks.

Carrier certifications have been slow coming. US WEST and Sprint Corp. reached an agreement last May, but Pacific Bell, for example, is only just now set to announce its first certifications.

The carriers are also working together on operational issues. Earlier this month, AT&T, Sprint, GTE Telephone Operations and all seven RBHCs made progress on forging a key new procedure to order end-to-end frame relay service.

At a New Orleans meeting of the new Frame Relay Interconnection Workshop, sponsored by Bell Communications Research, the carriers tentatively agreed on frame relay specifications to be added to the Access Service Request (ASR), an electronic form used by interexchange carriers to order local access lines from local carriers on behalf of end users.

Until now, the ASR has only accommodated T-1 and other dedicated access facilities to long-distance carriers' points of presence. Using the upgraded ASR and the NNI interface with local exchange carriers (LEC), Sprint and AT&T are planning to offer frame relay services that include frame relay local access purchased from LECs (*NW*, Sept. 19, page 1).

The specs agreed to by the Frame Relay Interconnection Workshop will be presented to the telephone industry's Ordering and Billing Forum in Chicago on Oct. 31.

NET scales up IDNX

BY MICHAEL CSENGER

Redwood City, Calif.

Network Equipment Technologies, Inc. (NET) last week announced a software release that supports many more IDNX multiplexers per WAN, but that still leaves customers without adequate enterprise network management integration.

The IDNX software Version 13.X1 supports a new feature called SuperWAN that raises the maximum number of IDNXs in a network to tens of thousands by adding support for domain addresses. Previously, an IDNX network was limited to 250 wide-area nodes, said Hans Kramer, NET's director of IDNX development.

SuperWAN effectively subdivides a WAN by adding a domain address to the IDNX's standard node-card-port addressing scheme, Kramer said. Each domain is limited to 250 nodes, but the new release supports as many as 16,000 separate domains.

SuperWAN is intended mainly to ease the IDNX's scalability limits in large carrier or government networks. But it will provide network control benefits to midsize private networks, Kramer said.

"Especially in terms of the organizational or regional [hierarchy] of a network, this can provide more flexibility in controlling access," he said.

Previously, managers of IDNX-based networks could restrict access on an individual user basis. With SuperWAN, an IDNX can also be used to restrict access from specific nodes and entire domains, as well.

See **IDNX**, *page 87*

CORRECTION

A recent story about new Cabletron Systems, Inc. token-ring products (Oct. 10, page 22) should have noted that Optical Data Systems, Inc. ships per-port configuration switching capabilities for token-ring, and not the per-module feature stated.

Here's A List Of All The Companies That Can Solve All Of Your Low-End Internetworking Problems.

As you can see, no other company gives you more low-end internetworking solutions. With Access by Cisco,℠ we've expanded our access product line to meet your low-end internetworking demands. From software-only routers to PC cards to enterprise remote servers. And as part of our completely scalable product line, Access by Cisco gives you a low-end platform that expands according to your internetworking needs. Also, our exclusive Internetwork Operating System™ ensures that your network can talk to any other network regardless of protocol, medium, or platform. If you're considering a low-end router, why not get an expert opinion? Call us at 1-800-859-2726. You'll see there is only one answer.

Access by Cisco.℠ Bringing the power of internetworking to everyone.℠

©1994 Cisco Systems, Inc. All rights reserved

Novell protocol to alleviate WAN traffic congestion

BY JODI MARDESICH

San Jose, Calif.

Novell, Inc. last week released the long-awaited routing technology it claims will reduce WAN traffic from NetWare LANs an average of 40% when implemented in its own products and those from other vendors.

NetWare Link Services Protocol (NLSP) eliminates the traffic generated by the IPX Router Information Protocol (RIP) and Service Advertising Protocol (SAP) used to advertise the location of NetWare routers and the availability of NetWare servers, respectively.

The technology is key to efforts by Novell and other vendors to ease the wide-area congestion that has long plagued NetWare users. It is expected to be implemented in everything from Cisco Systems, Inc. routers to Novell's own future Asynchronous Transfer Mode-based products.

The first such products are due out by year end, and, judging from initial beta-test results, they could have a dramatic impact.

Rick Morad, telecommunications coordinator for Rockwell in Seal Beach, Calif., saw a performance improvement of more than 60% when transferring a 5M byte file over a 19.2K bit/sec line. "Without NLSP, it took an hour and 10 minutes. With NLSP, it took 26 minutes," he said.

Morad used two Novell NetWare Multiprotocol Routers (MPR) for the test, although that is not his ideal configuration.

"We're waiting for Cisco to support NLSP," Morad said. "They've been promising, and we're waiting."

According to a spokeswoman for Cisco, the company plans to support NLSP in the next release of its routing software, due in the first quarter of 1995.

In addition to Cisco, vendors including 3Com Corp., Wellfleet Communications, Inc., IBM and Newport Systems Solutions, Inc. have licensed source code for NLSP, and a few have outlined rollout dates. 3Com, for example, said it will ship NLSP support in its NetBuilder routers by Dec. 8.

For its part, Novell will integrate NLSP into NetWare 4.1, due out by year end, and the next release of the MPR. MPR Version 3.0 has not been formally announced, and no availability date has been set. However, one beta tester expects MPR 3.0 will also be released by the end of this year.

AN EFFICIENT PROTOCOL

NLSP is a link-state protocol based on the Open Systems Interconnection Intermediate System-to-Intermediate System protocol, according to Mary Petrosky, an analyst in the San Mateo, Calif., office of The Burton Group consultancy. Link-state protocols scale better and adapt more quickly to network

See **Congestion**, *page 86*

IBM, AT&T to ship powerful Pentium server packages

BY PEGGY WATT

IBM and AT&T last week each unveiled new high-speed Pentium-based servers bundled with competing network operating systems and tools.

IBM said the IBM PC Server 500, an expandable 90-MHz Pentium-based member of its Server 95 family. AT&T Global Information Solutions said it is shipping its System 3416 Entry-Level Server in single and dual Pentium configurations, bundled with Microsoft Corp.'s BackOffice server suite.

IBM's PC Server 500 has eight slots and 22 bays, with 32M bytes of random-access memory, a 256K-byte cache and four parallel ports. It is available in six models that vary in terms of disk capacity and whether they support a hard disk. Users can upgrade existing Server 95 models to the Pentium processor.

Available now is the $9,739 model with a 90-MHz Pentium, 32M bytes of RAM and a 1G-byte hard disk; other configurations will ship next month.

All of the PC Server models come with ServerGuide 2.0 on CD-ROM, which provides either the Novell, Inc. NetWare or IBM LAN Server and tuning tools.

Also included is NetFinity 2.01, which monitors and manages hardware systems. NetFinity supports Windows servers, as well as OS/2 clients and servers, Windows clients and NetWare servers.

Also new are the IBM Ethernet Quad PeerMaster Server Adapters, which are 32-bit, four-port Ethernet adapter cards. The card for 10Base-T unshielded twisted pair costs $2,399, while the card for 10Base2 thin coaxial cable costs $2,669. Server pricing will be announced upon shipment.

The AT&T 3416 comes with a choice of a 60-MHz or 90-MHz Pentium, or dual 66-MHz processors for symmetrical multiprocessing applications. A Redundant Array of Inexpensive Disks (RAID) controller and the AT&T WaveLAN wireless adapter come with the package. The server includes eight Extended Industry Standard Architecture I/O slots, as many as 256M bytes of RAM and eight bay drives. Pricing starts at $7,000.

The BackOffice software package is a bundle of Microsoft applications, including Windows NT Server 3.5, SQL Server, SNA Server, Systems Management Server and Microsoft Mail.

✆IBM: (800) 772-2227; AT&T: (800) 796-9476.

Getting a handle on cc:Mail nets

Lotus last week announced a new Windows-based tool that will let electronic mail administrators monitor the health of enterprise cc:Mail networks.

Based on cc:Mail Router 5.12, cc:Mail View collects data from post offices in a central location and then uses a graphical interface to show the status of individual post offices, links and routers connecting the network to outside E-mail systems.

Administrators can use the software to create detailed reports. The software is bundled with a copy of Lotus' desktop Approach database, along with a series of report templates.

Administrators can create maps of different parts of their E-mail networks; for example, one showing only the status of mobile users, or one showing post offices or network links with potential.

The software relies on E-mail messages periodically sent from each post office that include such information as the number of queued messages, delivery times and size of message stores.

Lotus officials said the software is the first step toward the comprehensive management framework promised for the Lotus Communications Server, due out in mid-1995.

Mike Rothman, an analyst with the META Group, Inc. consultancy in Reston, Va., said cc:Mail View gives Lotus a serious competitive advantage over Microsoft Corp. because Microsoft Mail lacks a strong management tool.

Bill Wyatt, global network E-mail administrator for Fluor Daniel, an engineering company in Greenville, S.C., said he will evaluate cc:Mail View, along with tools from such vendors as Baranof Software, Inc., as a possible replacement for the homegrown applications he now uses to oversee a 20,000-user, 137-post office cc:Mail net.

Wyatt, who has seen a beta copy of the Lotus software, said his main concern with the tool is the potential size of the file into which all the post office information would flow. A similar text-based system for monitoring cc:Mail grew to 10M bytes in just three days, he said.

Fluor Daniel's own tools — based on the idea of periodically sending messages to post offices from a central location — work fine, but the company is looking to Lotus and other vendors for management software so it does not have to worry about maintaining such software, he said.

Pricing will start at $2,995 per management station.

Lotus: (617) 577-8500.

BY ADAM GAFFIN

Lotus

Continued from page 1

land Chemical Co. in Dublin, Ohio.

"The only Lotus product we use is Notes, and SmartSuite is not enough to get us to change a [desktop] standard and deal with 600 screaming users," he added.

"It sounds like a typical competitive ploy to keep Lotus up with Microsoft," said Rick Kirkland, senior network analyst for South Carolina Electric & Gas, a Scana Company.

It is a good move by Lotus, but it comes "a day late and a dollar short" for the utility, he said.

South Carolina Electric & Gas runs Lotus Organizer and cc:Mail; however, it recently standardized on Microsoft Office at the desktop.

"If Lotus had done this six months ago, when we were trying to decide what to do, this would have helped," Kirkland said.

THE BUNDLE

Lotus will bundle a full Notes client — as opposed to a lower end Notes Express client — with SmartSuite and will offer a server version of Notes as an option. Industry sources said the bundle will cost about $800 compared to the $990 price of the two products sold separately.

Lotus officials declined to comment.

Notes typically sells for between $300 and $400 per user in volume, while SmartSuite has a list price of $495.

In addition to the Notes client and server, the bundle Lotus will offer will include a set of five or more sample Notes applications that will work with SmartSuite products, such as the 1-2-3 spreadsheet package and Ami Pro word processing offering.

WHAT'S INCLUDED

The applications will include a contact manager, several library-type applications that store and categorize spreadsheets, word processing documents and other files, as well as workgroup applications that can automate processes between departments in an organization.

It will additionally include news applications, which gather and distribute information from within Notes databases and other applications, including on-line information services.

Users can also build Notes applications, or adapt the ones that come in the bundle, to work with SmartSuite using Lotus' FX integration technology.

Although the Notes applications that come in the bundle are written specifically to link SmartSuite applications with Notes, the bundle will not add any tighter Notes/SmartSuite integration than already exists according to, industry sources said.

In the long term, Lotus needs to increase the level of that integration to outdo Microsoft Office, which also supports FX, said David Marshak, an analyst at Patricia Seybold Group, Inc. in Boston.

Ashland Chemical's Riley said the FX support in the next version of Microsoft Office provides plenty of integration with Notes for most users.

Suite deal

SmartSuite, as sold without Notes
- Ami Pro word processor
- 1-2-3 spreadsheet
- Organizer personal information manager
- Approach database
- Freelance Graphics presentation packages
- Pricing: $495 or $299 to upgrade

Notes
Pricing: $495

SmartSuite with Notes and Notes applications
List price: approximately $800

Even without special integration, bundling Notes with SmartSuite makes it easier for Lotus to develop and sell packaged applications that run in Notes and use SmartSuite applications, Marshak said.

When the products were sold separately, Lotus could not assume SmartSuite users had access to Notes, so it could not deliver integrated applications to encourage sales of either Notes or SmartSuite, according to Marshak.

Isocor reveals X.400 message server for mail switchover

BY ADAM GAFFIN

Los Angeles

Isocor last week began rolling out a line of cross-platform messaging servers aimed at creating wide-area enterprise E-mail networks.

The new server software, code-named Cheetah, will officially be called Isoplex Version 4.0, although it has a different architecture than previous versions of Isoplex, said David Knight, vice president of marketing at the Los Angeles messaging company. The products are based on the 1992 X.400 specifications and are available on several Unix platforms.

In addition to redesigning the messaging engine to boost throughput, Isocor has integrated support for such protocols and services as the Multi-purpose Internet Mail Extensions, X.435 electronic data interchange and X.445, a new international standard for dial-up X.400. The server can also handle Simple Mail Transfer Protocol, TCP/IP and X.400 over TCP/IP.

Longtime Isocor user Michael Higgins said Cheetah "is the best X.400 implementation I have seen, and I've seen several." Higgins, who recently took a job as a back-end application architect at web-browser vendor Mosaic Communications Corp., test drove Cheetah when he was a technical support manager for garment manufacturer Byers California.

The software currently supports Lotus Development Corp.'s cc:Mail and Microsoft Corp.'s Microsoft Mail. A built-in message store and support for Microsoft's Extended Messaging Application Program Interface will let developers build client/server messaging systems — although users can also stick with existing file-server post offices.

By year end, the company expects to add connectivity to IBM Professional Office System (PROFS), Digital Equipment Corp. All-In-1 and Wang Laboratories, Inc. Wang Office using gateway software from Boston Software Works, Inc.

Mike Rothman, an analyst with META Group, Inc., a consulting firm in Reston, Va., said such connectivity will be critical to Isocor's success because of the large numbers of users still on these legacy systems.

Knight said scalability will help differentiate the new line from competitive offerings from Control Data Systems, Inc., Lotus' SoftSwitch line and Digital. Users can start with a server on an Intel Corp.-based server and work their way up to a host offering on a Stratus Computer, Inc. platform.

Currently shipping are versions for SCO Unix, HP-UX and for Unix variants sold by Sequent Computer Systems, Inc. and Stratus. By year end, the company will ship versions for SunSoft, Inc.'s Solaris, AIX and OS/2, along with a version meant for AT&T Global Information Solutions Unix platforms.

The software includes management consoles for Unix and Windows platforms, letting users manage things like security and access control across a net. Users can also set limits on the size of messages routed to various nets. A separate management tool set based on the SNMP and the Messaging and Directory Management MIB are due early next year, he said.

Pricing starts at $6,450 for the SCO Unix version. A Stratus system can range in price from $30,000 to several hundred thousand dollars, depending on configuration.

✆Isocor: (310) 476 2671.

LAN video spec receives mixed marks in debut

BY ELLEN MESSMER

Anaheim, Calif.

An industry group led by Intel Corp. last week offered its first demonstration of a desktop system for video and data-sharing based on a soon-to-be-released specification for multivendor LAN-to-WAN conferencing.

The data-sharing portion of the conference, which was conducted at the TeleCon XIV show here, went off fine. But the video-over-Ethernet demo involving equipment from Intel, Compaq Computer Corp., NEC Corp. VTEL Corp. and others was marred by poor picture and sound quality.

Patrick Gelsinger, general manager for Intel's personal conferencing division, said the demo reflected pretty closely what the Personal Conferencing Work Group (PCWG) 1.0 specification will deliver.

While vendors in the group acknowledged that improvements are needed, more than a dozen members of the influential association endorsed the specification as vital to fostering interoperability and voiced their commitment

See **Video spec**, *page 86*

Just off Route 75, in Richardson, Texas, is the networkMCI Developers Lab.℠ Here, in the only facility of its kind, independent developers and customers can test hardware, software and systems applications on a live network — and prove just how effectively these technologies will travel on the superhighway. You'll have direct access to MCI's backbone network and all its services — from narrow-band analog voice to ultrahigh-speed digital data. So before you get ready to drive onto the information superhighway, make a right off Route 75 and stop by the Developers Lab for a tune-up.

networkMCI
DEVELOPERS LAB
1-800-246-4170

© MCI Telecommunications Corporation, 1994.

Installing their Token Ring adapter takes a good morning's work.

Token Ring adapter installation has always been a time-consuming, complex task requiring a series of tedious, manual steps: setting dip switches, configuring around PC resource conflicts and installing drivers, just to name a few.

At 3Com, with our new TokenLink® III adapters, we've eliminated that problem for good. Because we've made the manual steps automatic.

In the unbiased words of LANQuest Labs®: "3Com's TokenLink III with AutoLink™ is easier to use and faster to install than any other Token Ring adapter that we tested."

A one-step menu selection is all it takes, and AutoLink does the rest—including auto-configuration, running diagnostics and installing NetWare® client files. All in less than three minutes.

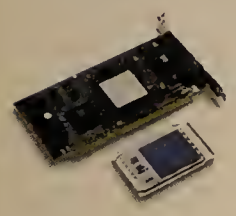
What's more, our new TokenLink III PCMCIA adapter supports PC's with or without Card Services—automatically. And it's compatible with the leading notebooks. Guaranteed. Or your money back.

© 1994 3Com Corporation. (408) 764-5000. 3Com, Networks That Go the Distance, AutoLink, SmartAgent, TokenLink and Transcend are trademarks of 3Com Corp. All other trademarks are property of their respective holders. *Limit one per customer while supplies last.

WAN BACKBONE SOLUTIONS SWITCHING HUBS REMOTE OFFICE BRIDGES & ROUTERS

CHASSIS HUBS PCMCIA ADAPTERS CENTRAL SITE ROUTERS WORKGROUP SOLUTIONS ETHERNET ADAPTERS

Installing ours allows you a good morning's work.



Ease-of-use doesn't end after installation. With Transcend™ TokenLink SmartAgent,™ you get SNMP management all the way to the desktop, even in unmanaged MAU environments.

And you get it all without compromise. Because, as always, the entire TokenLink III family—ISA, PCMCIA, EISA and Micro Channel—is 100% IBM compatible and comes with a lifetime warranty.

To see just how easy installing 3Com's TokenLink III adapters can be, you can try our new PCMCIA adapter for just $199.*

For more information on how 3Com can provide your enterprise-wide Token Ring solution, or to order your evaluation card, call **1-800-NET-3Com**.

It will definitely make for a good morning.

3Com®

STACKABLE HUBS TOKEN RING ADAPTERS NETWORKS THAT GO THE DISTANCE

Capital

Continued from page 1

always embrace new and better concepts, said John Baker, senior vice president at the New York-based venture firm Patricof & Company Ventures, Inc.

"My best chance for a successful investment comes with a technology that's dramatically better — 10 times better in cost or performance — than what it replaces," Baker said. "But the market leaders have their own interests to protect. They have a hard time with the idea of actively obsoleting their installed base."

The same VCs tend to appear again and again in successful network industry start-ups, said Seth Kenvin, senior editor of *The Red Herring*, a monthly magazine that follows technology investment.

"Recent Ethernet switching and Asynchronous Transfer Mode start-ups, such as Agile Networks, Inc., Kalpana, Inc. and Cascade Communications Corp., were often spawned by the same firms that brought out the routing companies these new technologies now seek to displace," he said.

"These VCs have ridden wave after wave on the customer premises and hit eight times or even 100 times on their investment," Kenvin said. "Even the start-ups that aren't a brilliant success, like Crescendo Communications, Inc. or Synernetics, Inc., get acquired for $100 million."

Hot areas of investment today include electronic commerce, ATM, network outsourcing, object-oriented technology and software, according to Howard Anderson, general partner at Boston-based Battery Ventures.

"Anything that helps a user reduce costs in their network is always a good thing to invest in," he said.

WHAT THEY BRING

More than money, the VCs provide contacts in the industry. Working behind the scenes, they help their start-ups put together a management team and then help forge partnerships and alliances with other established companies (see story, this page).

FLACH

"Start-ups are usually focused on their product and the immediate goals they face," said Jim Flach, a partner with Accel Partners of San Francisco. "They're trying to get it out the door, while we're lining up a truck and helping develop the distribution channels."

VCs wield their influence officially, as member of the start-up's board of directors.

"Securing a board position is key because we get in on the monthly meetings and speak to the CEO once or twice a week," Anderson said. "In that role, we can help broker strategic alliances and point them to major users who have a need for their offering."

VCs rarely work alone. Two or three usually partner together on a deal, although one firm takes the lead and interacts directly with the start-up, gaining a larger share and also a seat on the board.

Weighing profit and risk, firms partner together in a web of relations that serves to minimize their exposure to any one investment. Ralph Ungermann's First Virtual Corp. is a notable exception, funded entirely by Accel.

For all its forward-thinking, venture capitalism is a conservative business. The VCs' money is not their own.

Companies have to answer to their own investors — large pension funds and institutional players who ante up tens of millions of dollars.

Some VCs hold on to a company for many years, while others cash out soon after the start-up goes public. Likewise, some VCs play an active role, while others lend a quieter hand.

"We're very hands-on, but we don't forget that it's their company and they're in charge," said Kevin Compton, a partner at Kleiner Perkins Caufield & Byers in Menlo Park, Calif.

"Every board you sit on represents a deal you can't do," said Geoffrey Yang, a partner at Institutional Venture Partners in Menlo Park, Calif. "We have to recycle our board seats in order to keep going."

Finding and screening new prospects is an equally consuming task. Of the 1,000 deals that Battery Ventures may consider during a year, the firm only invests in about six of them, Anderson said.

"The other 994 are a lot like those characters in 'The Wizard of Oz.' Some don't have heart, some don't have the brains, and some are simply afraid," he said.

HELPFUL FEEDBACK

Many VCs cultivate user advisory boards and listen carefully to their feedback to help figure out which companies to invest in. Users can help gauge a new product's potential market and can also trigger new ideas with their needs and complaints.

"If enough customers tell me they need such and such, I'll go start a company to build it," Yang said.

DEAD AHEAD?

When start-ups go bad, they die with more of a whimper than a bang. Other firms pass up the second-round financing, and the venture decays.

Real failures are counted more as missed opportunities.

"The biggest concern for us is opportunity cost," said Accel's Flach. "You hate to miss out on something like Cascade because you were busy elsewhere."

Battery Ventures, with a 31% internal rate of return, has its bloopers, as well. The firm passed up ground-floor tickets with both Wellfleet Communications, Inc. and SynOptics Communications, Inc.

"Paul Severino gave us four chances to invest in Wellfleet, and we didn't bite," Anderson said. "When SynOptics came to us originally, we didn't like its strategy of selling products through the telcos, so we balked. The firm eventually changed its channel approach, but never came back to us to tell us so."

Flops of a louder sort may loom ahead. *Red Herring's* Kenvin notes that this industry's VCs have yet to face the sort of shakedown now wracking biotechnology. But a recent glut of switched Ethernet start-ups could possibly bring the first major shock.

The VCs aren't worried, though, with their focus always out two or three years ahead.

"One thing about communications now that has everyone fascinated is that the demand curve appears to be elastic," said Patrikof's Baker.

Top venture capital firms in the network industry

Company/ Phone number	Key investments
ABS Ventures (410) 783-3263	Agile Networks, Inc., Cascade Communications Corp., Synernetics, Inc. (acquired by 3Com Corp.), Wellfleet Communications, Inc.
Accel Partners (415) 989-5656	Agile, Alantec Corp., Centillion Networks, Inc., First Virtual Corp., Synernetics
Advent International (617) 951-9400	Cascade, Chipcom Corp., Kalpana, Inc., Video Server, Inc.
Battery Ventures (617) 367-1011	Advanced Computer Communications/Newbridge Networks, Inc., Banyan Systems, Inc., Fore Systems, Inc., Primary Rate
Bessemer Venture Partners (415) 854-2200	Cascade, ON Technologies, Inc., Performance Systems International, Versant Technology Corp., Video Server, Worldtalk Corp.
Charles River Ventures (617) 292-7717	Agile, Cascade, Chipcom, LANart Corp.
Institutional Venture Partners (415) 854-0132	Crescendo Communications, Inc. (acquired by Cisco Systems, Inc.) NetLabs, Inc., Synernetics, SynOptics Communications, Inc., Wellfleet, WhiteTree Network Technologies, Inc.
Kleiner Perkins Caufield & Byers (415) 233-2750	Ascend Communications, Inc., Citrix Systems, Inc., Kalpana, Shiva Corp.
Matrix Partners (617) 345-6740	Cascade, Grand Junction Networks, Inc., Video Server, WhiteTree
Mayfield Fund (415) 854-5560	Alantec, Centrum Communications, Inc. (acquired by 3Com), Crescendo, Network Computing Devices, Inc., 3Com
Menlo Ventures (415) 854-8540	Ascend, Combinet, Inc., Efficient Networks, Inc., Kalpana, NetLabs, SynOptics
Merrill, Pickard, Anderson & Eyre (415) 854-8600	Grand Junction, Kalpana, Network Equipment Technologies, Inc., Starlight Networks, Inc., Synernetics
Oak Investment Partners (415) 854-8825	Cooperative Solutions, Inc., SoftSwitch, Inc.
Sequoia Capital (415) 854-3927	Alantec, Centillion, Cisco, Crescendo, 3Com
Sigma Partners (415) 854-1300	Cascade, Chipcom, Synernetics, Wellfleet, Xyplex, Inc.
Summit Partners (415) 321-1166	Artisoft, Inc., Digital Link Corp., Fibermux Corp., Fiber Options, Octocom Systems, Inc., Proteon, Inc.
Sutter Hill Ventures (415) 493-5600	Grand Junction, Primary Access Corp., Synernetics, T3plus Networking, Inc.
TA Associates (617) 574-6700	Alantec, Microtest, Inc., NetEdge Systems, Inc., Network General Corp.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: *THE RED HERRING*, REDWOOD CITY, CALIF

Centillion's story

The founding of a new company starts with a simple but important first step: Quit your day job.

Bobby Johnson and Centillion Networks, Inc. cofounders Earl Ferguson and Selina Loh left their jobs at Network Equipment Technologies, Inc. last year to pursue an untapped market for token-ring switching combined with Asynchronous Transfer Mode.

JOHNSON

"The venture partners like to see how committed you are," said Johnson, Centillion's president and chief executive officer.

"They like to know they're not the only ones taking a risk," he added.

Johnson and Ferguson also spent several months talking to potential customers while running their technical concepts past engineering friends. With positive feedback on all fronts, a business plan sewed tight and budgets planned two years ahead, the founders started approaching venture capital firms, or VCs.

The VCs ran Centillion's ideas through an even rougher due-diligence gauntlet. "They took it to a couple of their own prospective customers. They brought in engineering consultants who took our design apart, and they ran the whole thing by the senior management of some of their other portfolio companies," Johnson said.

The entire process is not for the faint of heart.

Venture firms often sit on the boards of potential rivals, and there's certainly a chance that someone along the way could run with the idea themselves.

"It took about five months from the time we first nailed up our business plan to the time we deposited the VCs' check," Johnson said.

Working directly with Institutional Venture Partners (IVP), Centillion courted two other venture firms: Accel Partners and Sequoia Capital. Meanwhile, Centillion's founders haggled with IVP for the final deal: $4.7 million in capital for Centillion in exchange for three board seats and slightly more than a 50% stake in the company for the venture firms.

With a full management team now in place, Centillion's first product is in beta testing.

BY MICHAEL CSENGER

THE NEXT WAVE OF WINDOWS NT SYSTEMS IS HITTING RIGHT NOW.

NEW WINDOWS NT WORKS
A POWERFUL BREAKTHROUGH

Now the productivity level of your business can reach new heights. Microsoft® Windows NT™ Workstation, Windows NT Server and Microsoft's integrated suite of server applications bring you the power and connectivity to run your business better, smarter and faster. And that will make quite a splash with your customers.

More than 1,000 business solutions, like financial trading, accounting and inventory control systems, are now available for the Microsoft® Windows NT platform to give you the competitive edge. The kind of reliable, high-performance solutions you expect on high-end systems, at a price you demand for PC hardware and sofware.

From file server to application server: The power to run your business.

Whether you need to run basic file and print or sophisticated applications on your network, Windows NT Server can do the job.

Windows NT Server works with any client, including Windows™ for Workgroups, MS-DOS® or Windows NT Workstation operating systems. And with this release, our highest-rated product for customer satisfaction just got better.

Dramatic performance improvements allow users to access the information they need up to twice as fast, to make better decisions and deliver exceptional service. Graphical tools make managing the network easier. And it provides complete connectivity with your existing networks, including NetWare®, UNIX®, Macintosh® and IBM® SNA systems, so your current network can take advantage of the new generation of server applications coming to market on Windows NT. Quickly and easily.

Windows NT architecture seamlessly integrates more than 1,000 business solutions, including the ones you use now.

Introducing the new Microsoft family of server applications.

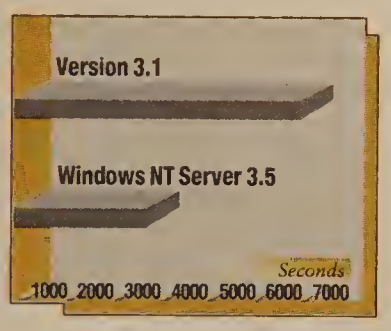
Now more than ever, efficient information sharing and management is crucial to serving customers and staying competitive. The new Microsoft family of server applications—for

*Please specify Windows NT Workstation or Windows NT Server evaluation kit. **Based on BAPCO-Sysmark94 results—48 clients total time.

© 1994 Microsoft Corporation. All rights reserved. Offer expires January 15, 1995. In the 50 United States, call (800)434-3902, Dept. H4M. Customers in Canada, call (800)563-9048; outside the United States and Canada contact your local Microsoft subsidiary or call (206)936-8661. Microsoft, MS-DOS, and Win32 are registered trademarks and Windows and Windows NT are trademarks of Microsoft Corporation. DEC is a registered trademark and Alpha AXP is a trademark of Digital Equipment Corporation. Intel is a registered trademark and Pentium is a

TATION, SERVER AND MORE.
N BUSINESS COMPUTING.

database management, messaging, host access and system management—can seamlessly integrate corporate information with the desktop to radically improve business performance, whether you're an emerging company or already one of the Fortune 500.



*New Windows NT Server 3.5 runs your applications twice as fast.***

And the open Windows NT Server platform integrates solutions from other major vendors in the industry as well, giving you maximum choice.

Windows NT Workstation: Incredible power and security.

Whether you run high-end manufacturing, engineering, financial, software development or other sophisticated applications on your desktop, Windows NT Workstation is ideal. This 32-bit operating system gives you all the power for high-end businesss-critical applications you need plus all of the Windows™-based productivity applications you need—all on a single system. And all for the cost of a PC.

The new 3.5 release of Windows NT Workstation has a substantially smaller memory requirement and runs applications up to three times faster—with full integration (via OLE objects) and crash protection for both 16- and 32-bit applications. It continues to be the best choice for a secure desktop, ensuring all important files and programs are protected from tampering and user error.

Full power now and into the next century.

Microsoft Windows NT and the Microsoft family of server applications are built to optimize your current investment while positioning you well for the future. The Win32® application programming interface and OLE object technology are Microsoft's strategic system technologies. Applications that run today will continue to run in the future, protecting your investments while providing a flexible client-server architecture that lets you quickly adapt to a changing business environment.

SOLECTRON

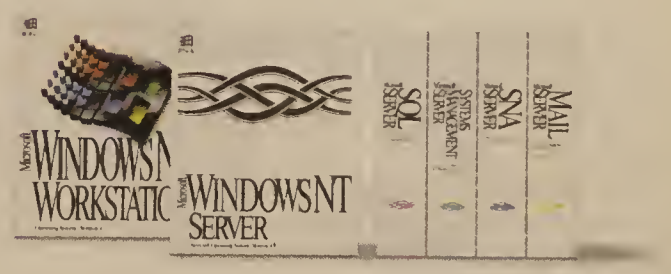
TULLETT AND TOKYO FOREX, INC.

DARBY®

Leading companies run their business on Windows NT. "Windows NT is the ideal platform for Tullett & Tokyo to implement our advanced real-time derivatives system." —Len Monteleone, V.P. of I.T.

Catch the Windows NT Wave.

Call (800) 434-3982, Dept. H4M, for a reseller or Solution Provider near you and your free evaluation kit.* And watch your productivity soar.



Microsoft®

trademark of Intel Corporation. Lotus Notes is a registered trademark of Lotus Development Corporation. Power PC is a trademark of International Business Machines Corporation. Macintosh is a trademark of Apple Computer, Inc. MIPS is a registered trademark of MIPS Computer Systems, Inc. NetWare is a registered trademark of Novell, Inc. SAP logo is a trademark of SAP America, Inc. UNIX is a registered trademark of UNIX Systems Laboratories.

CDPD backers woo developers to build wireless net data applications

BY JOANIE WEXLER

Santa Clara, Calif.

The first CDPD Developers Conference here last week aimed to convince nearly 400 would-be wireless application programmers that Cellular Digital Packet Data carries the marketing clout, development simplicity and technical merit to deserve their attention.

CDPD is an emerging digital overlay to the existing patchwork of nationwide analog cellular nets priced to accommodate bursty data traffic by allowing users to pay according to traffic volume. Cellular service is typically priced based on connection time.

CDPD is competing for developer and user mind-share, with a gaggle of budding wireless systems, such as those based on emerging personal communications services and enhanced specialized mobile radio technologies. It is also competing with existing packet-radio nets.

CDPD Forum member company representatives emphasized the widespread commitment among carriers and other players for a nationwide wireless service, as well as CDPD's IP technology base, as reasons for developers to build to CDPD.

Rand Baldwin, newly elected CDPD Forum executive director, pointed out that the forum's membership has grown to 78 firms — from 57 at its inception in June.

Terry Parker, president of the CDPD Forum, said the forum expects 50 major U.S. metropolitan areas to have CDPD service during the first half of 1995. Intercity interoperability services should emerge in some service areas by early 1995, he added.

Even as the conference was in session, services were rolling out: GTE Personal Communications Services became the fourth provider of commercial CDPD service, launching an offering in the San Francisco area. The move follows service kickoffs from Ameritech Cellular Services, Bell Atlantic Mobile Systems, Inc. and McCaw Cellular Communications, Inc. in recent months (see graphic).

Based on monthly volume, per-kilobyte prices from GTE will range from 12 to 19 cents. A kilobyte equals approximately a half page of text, meaning that short messages could be sent for about 3 cents.

CDPD's status

Carrier	Commercial service (now)	Commercial service (near term)
AirTouch	None	San Diego, San Francisco area by year end
Ameritech Cellular	Chicago area	Detroit, St. Louis by year end; Wisconsin, Ohio in 1995
Bell Atlantic Mobile (BAM)	Pittsburgh, Washington, Baltimore	All BAM regions by year end
GTE PCS	San Francisco area	Houston by year end
McCaw Cellular	Dallas, Miami, Las Vegas; parts of New York, Seattle and San Francisco area	Not available
NYNEX Mobile	None	New York in early 1995
Sprint Cellular	None	Not available

GRAPHIC BY TERRI MITCHELL

THE IP LURE

Applications for these services should be easy to develop since any software architected for TCP/IP will work over CDPD, said Allison Koenig, an independent software vendor development manager at McCaw Cellular's Wireless Data Division. In its simplest form, adapting IP applications to CDPD requires only a new interface to the cellular modem, which uses a radio frequency air link instead of a phone line.

However, IP developers typically have not had to worry about the bandwidth constraints of wireless and should be tweaking and fine-tuning applications to minimize the data downloaded over the network, according to Koenig.

On that score, McCaw intends to announce by the end of the year a testing, training and marketing opportunities program for CDPD developers, Koenig said.

The idea would be to instruct developers on how to design, say, messaging applications that do not download all messages to a user's mobile end station. Instead, the application could provide the user with a list of messages and allow the person to pick and choose which to read.

Start-up gets CDPD going

Start-up Wireless Connect, Inc. last week announced three products to help CDPD developers get going.

Its CDPD Starter Kit, scheduled for shipment in early 1995 for less than $1,500, includes sample applications, two modems and three months of Cellular Digital Packet Data service airtime. The software will come configured for Windows, Macintosh, Unix and DOS systems.

The idea is to allow a developer to set up a mini-CDPD network on the desktop to test CDPD's characteristics, said Patrick Glenn, chief executive officer of the company.

The idea is to allow a developer to set up a mini-CDPD network on the desktop to test CDPD's characteristics.

Wireless Connect's second product, the $1,500 to $4,000 CDPD Software Developers Kit, will allow for more advanced development. Programmers will be able to add encryption for the CDPD's IP layer and make use of compression algorithms.

The third offering will comprise Internet interface software and a wireless modem. The Internet software will be ready late next year.

Wireless Connect: (408) 296-1546.

BY JOANIE WEXLER

Database vendors eye OpenDoc for new access tools

BY BARB COLE

Cupertino, Calif.

In an apparent shift away from technology born at Microsoft Corp., vendors, including IBM, are looking to provide database access tools based on OpenDoc technology that will simplify the task of constructing client/server networks.

IBM said it will offer a data access component for OpenDoc with future versions of its DB2/2 database, while vendors, including Gupta Corp. and Oracle Corp., are said to be testing similar OpenDoc components.

Until now, most database companies have pledged support for Microsoft's Object Linking and Embedding (OLE) as a method for database access, but complaints about its performance, coupled with OpenDoc enhancements, are prompting vendors to rethink that strategy.

OpenDoc is being developed by Apple Computer, Inc., IBM and Novell, Inc.'s WordPerfect division, which have formed Component Integration (CI) Labs to support the technology.

It works by splitting software into pieces of reusable objects, which developers may bolt together instead of writing custom code.

In the data access realm, OpenDoc components could be designed to allow client applications to access several different databases.

Similarly, several front-end tools could use the same OpenDoc component to access a common data source.

"This will make it easier to build client/server systems because you can have one database component that does database queries, regardless of the data source," said Scott Hebner, program manager for object products at IBM.

Database companies have become more willing to experiment with OpenDoc since WordPerfect Corp. announced that it is developing code to make OpenDoc for Windows compatible with OLE, sources said. Apple will port that code to the Macintosh so OpenDoc will be compatible with OLE on the Macintosh, as well.

Databases do OpenDoc

Company	OpenDoc development platform
IBM	DB2/2 on OS/2
Oracle Corp.	Macintosh
Gupta Corp.	Macintosh
ACI US, Inc.	Macintosh and Windows

All of these efforts are under development.

GRAPHIC BY TERRI MITCHELL

Additionally, Microsoft has stated that OLE will use the company's Open Database Connectivity (ODBC) as a mechanism for accessing databases. But users have balked at that, saying ODBC is slow and hard to manage.

"Things like OpenDoc seem more viable than

See OpenDoc, *page 87*

IBM using teamwork to drive APPN technology

BY MICHAEL COONEY

Raleigh, N.C.

IBM and its APPN Implementors Workshop (AIW) team members last week adopted a variety of new features that will make it easier for users to build multivendor peer networks.

At its meeting here, the AIW decided on a way for vendors to add proprietary extensions to IBM's Data Link Switching (DLSw) specification while ensuring multivendor interoperability. The "vendor-specific" feature extension is actually an algorithm that enables one device to alert another that it is about to receive data in a way it may not understand.

DLSw defines how Systems Network Architecture and Network Basic I/O System traffic flows over TCP/IP backbones.

The group is considering a similar extension to the Advanced Peer-to-Peer Networking and is defining how users can build larger, multivendor APPN nets by employing IBM's Border Node, Asynchronous Transfer Mode and wireless communications technology.

APPN is IBM's technology for setting up peer network environments.

"These new capabilities — Border Node and the vendor-specific feature, in particular — add the connectivity options IBM and other vendors need if APPN is to become pervasive," said David Bryant, director of SNA technology for 3Com Corp. in Santa Clara, Calif.

AIW members were most excited by the vendor-specific extension to the DLSw specification. With it, DLSw vendors will be able to develop enhancements, such as prioritization, and still maintain interoperability with other vendors' products.

For example, the vendor-specific extension could let one DLSw router inform another device that it uses a proprietary traffic priority scheme, said Marcia Peters, IBM's senior APPN architect. If the second router supports that capacity, it would automatically adjust to the other device's parameters.

"Vendors can implement unique features immediately without coming back to the AIW and going through the approval process again," Peters said.

The first AIW-approved DLSw specification, Version 1, will be com-

See APPN, *page 87*

NOW

- Revolutionize the way you work.
- Print, copy, and fax without leaving your desk.
- Optimize productivity and performance.

YOU

Digital Imaging System GP55 Series

Canon has created a totally new concept in digital office equipment systems that redefines productivity and performance. The Digital Imaging System GP55 Series. It's the culmination of Canon's technological vision that is designed to meet your needs now and in the future. It functions on your network as a 30-ppm, 400 dpi laser printer that can staple, sort, and duplex. It's also a digital copier and can serve as a Group 3 Fax. All this without ever having to leave your desk.

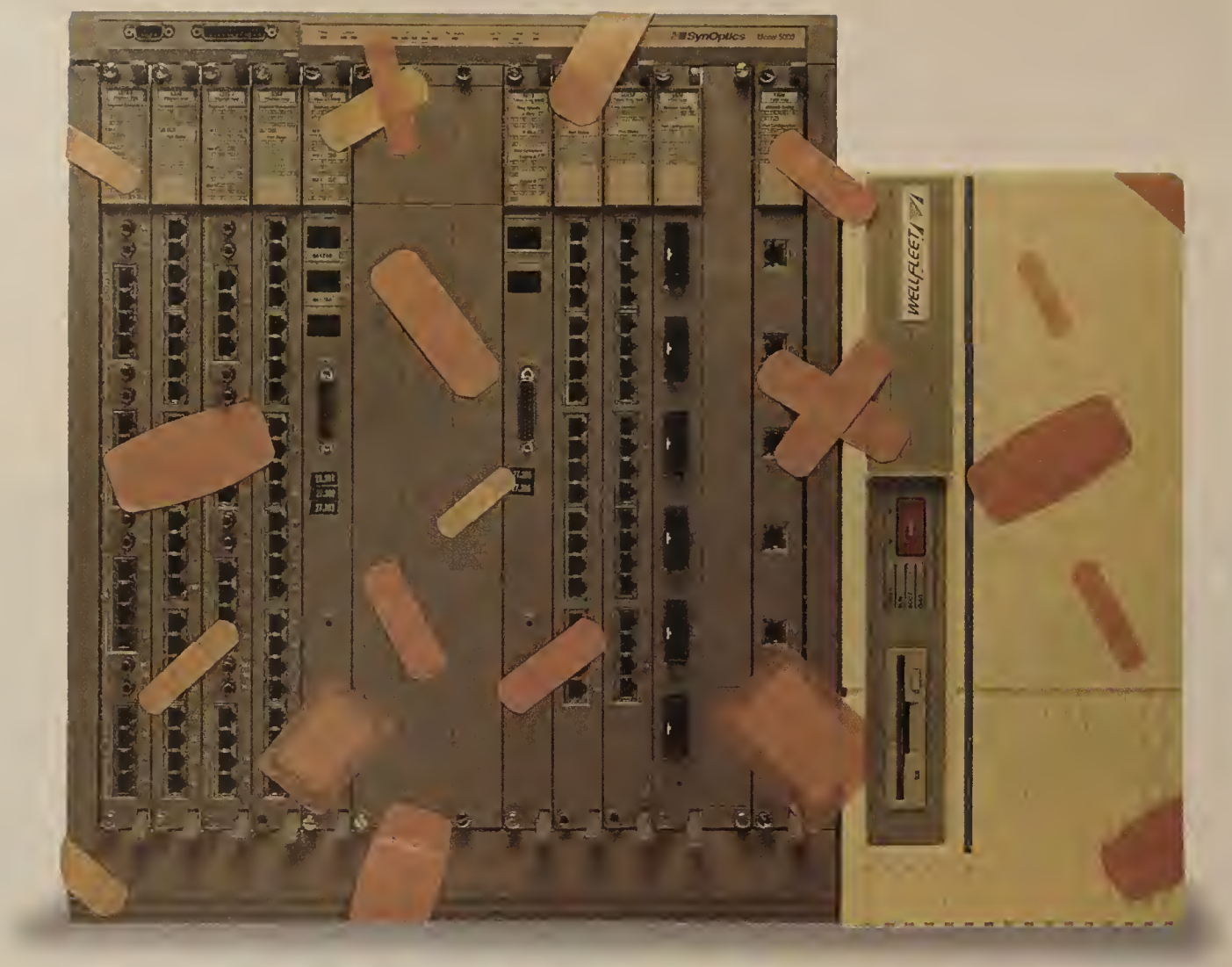
The GP55 Series does it all — with a unique, optional Multi-Device Controller (MDC) that gives you the flexibility to configure function boards to suit your needs. And since the GP55 Series utilizes parallel processing technology, it can perform more than one function at a time. But best of all, the GP55 Series interfaces with standard network protocols and page description languages. So now everyone on your LAN can sit behind their desk and benefit from the power of Total Document Management. Which makes this a true instrument of efficiency and productivity — with the reliability you've come to expect from Canon.

As usual, Canon's advanced technology moves you further ahead. When the rest say you can't, Canon says you can.

For more information, call **1-800 OK CANON.**

CANON

Canon



BAND AID SOLUTION

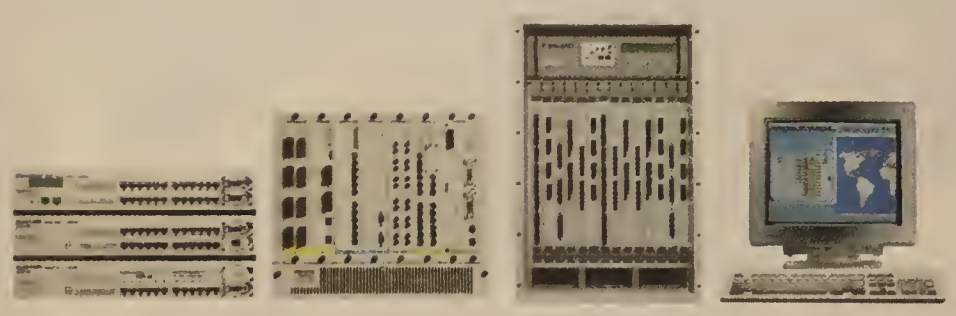
As the networking industry continues to grow, vendors are jockeying for position. Many are slapping together existing technologies in an attempt to keep up with increased customer demands. While this quick-fix solution may work at first, it will prove to be inadequate once ATM and advanced network management services become standardized.

Cabletron, on the other hand, has remained focused on developing products that meet your needs today and provide a smooth, cost-effective path to the emerging, high-bandwidth technologies of tomorrow.

Our singular vision has led to innovations such as the MMAC-Plus, a revolutionary hub that supports bridging, routing, packet switching and ATM from one centralized platform. This forward-thinking design enables you to realize the best benefits of broadband networking while protecting your current investments.

Find out for yourself. You'll see that while other vendors are stuck on the here and now, Cabletron has the foresight to take you as far as you're willing to go.

Call (603) 337-2705. And ask for your free, informational MMAC-Plus CD ROM presentation.



CABLETRON SYSTEMS
The Complete Networking Solution™

ONE COMPANY.
ONE VISION.

Corporate: Rochester, New Hampshire U.S.A. (603)332-9400 • **Europe:** Berkshire, England (011)44-635-580000 • **Asia:** The Cavendish, Singapore (011)65-775-5355 • **Australia:** Frenchs Forest, NSW (011)61-2-950-5900

BANDWIDTH SOLUTION

This small appliance is easy to customize.

This one is too.

Introducing the Digital Celebris,™ designed to be as simple and adaptable as your basic stereo. Like any small appliance, it comes with all the features you want, so it includes PCI local bus and 64-bit graphics performance. And you can choose the amount of memory and speed, up to a 90MHz Pentium™ processor. Once it's yours, it can be modified in seconds to meet your changing needs, just by popping the easy-access enclosure to switch cards or add memory. Without tools. Without disconnecting peripherals. But always with the nice, secure feeling you get from a Digital 3-year limited warranty. If you think the Celebris sounds good now, wait till you own it a while. Call 1-800-599-2360 for your nearest reseller. Please reference JEV when you call. 8:30 a.m. to 8:00 p.m. Mon-Fri. ET.

digital PC
Beyond the box.

Introducing the Digital Celebris.

© DIGITAL EQUIPMENT CORPORATION 1994. The Digital logo and Celebris are trademarks and Beyond The Box is a service mark of Digital Equipment Corporation. Pentium is a trademark and the Intel Inside logo is a registered trademark of Intel Corporation.

LAN/WAN INTEGRATION

Firm offers multipurpose comm server

BY MICHAEL CSENGER

Mountain View, Calif.

CommVision Corp. today will announce its next-generation CommSwitch Series 2000, a family of communications servers focused squarely on meeting large-scale enterprise requirements.

Designed to integrate both wide-area communications and local-area server needs, CommVision's products up to now have focused mainly on remote access and central-site LAN capabilities. To better meet large-scale enterprise networking requirements, CommVision has now boosted performance, throughput and scalability with its CommSwitch Series 2000.

The products let network managers mix and match various industry-standard application processors that provide all features and functions in a completely open, nonproprietary environment. For example, a central-site unit could be equipped with an electronic mail server, fax server, file server, Systems Network Architecture gateway and a remote access server that lets branch office users dial in to the corporate LAN.

Each server function is supported on a separate application processor module. These personal computer-based modules are acquired from third-party vendors, meaning users can install whatever industry-standard communications boards they want. The CommSwitch line supports a number of different operating systems, as well (see graphic).

"Other vendors are in the business of capturing a customer base," said Arthur Chang, CommVision's president and chief executive officer. "We provide an open platform that lets you add any industry-standard feature that comes along over time. You don't have to wait for us to provide it."

A server for all seasons

The CommSwitch Series 2000 communications server supports multiple network needs.

Protocols: AppleTalk, DEC LAT, IP, IPX, OSI, PPP, SLIP and SNA

Wide-area access: Analog dial-up, frame relay, ISDN BRI and PRI, switched 56, T-1, fractional T-1 and X.25

Features and services supported: E-mail, Ethernet, fax, file server, LAN hub, Lotus Notes, NetWare, security server, token ring and World-Wide Web

NEW NAME, BIGGER GAME

CommVision has renamed its entire product line to reflect the company's data communications slant. The former Communique servers are now called the CommSwitch Series 800 and Series 1000.

The CommSwitch Series 2000 comprises three products: the Model 2500, 2700 and 2800, with 20, 80 and 160 slots, respectively.

The Series 2000 has an improved backplane architecture, called PacketBus II, to support higher throughput and scalability. The chief enhancement is a 32-bit architecture, replacing the earlier 16-bit PacketBus.

The PacketBus II uses a frame-based protocol to carry traffic between application processor modules. Running at 33M bit/sec, the PacketBus II also uses variable-length frames — down to 32 bytes — to support voice and video-conferencing capabilities. Such features will be important in computer-telephony integration applications, Chang said.

Each application processor module also has its own 800M bit/sec local bus for switching traffic among ports on that card. With up to 10 such modules on one platform — the other slots occupied by simple interface line cards — total capacity is nearly 8.5G bit/sec.

"They have the potential to satisfy backbone needs, building on their remote access," said John Girard, an analyst at Gartner Group, Inc. in Stamford, Conn. "They already support T-1s and frame relay, for instance. But now we need to see some performance numbers — what sort of throughput they can provide and what qualities of service."

The CommSwitch Series 2000 will be available by the end of November. All modules will be backward- and forward-compatible with the early systems. The 20-slot Model 2500 starts at $22,495, ranging up to about $100,000 for a fully loaded system.

✆CommVision: (415) 254-5720.

Cisco links mainframe with the internet world

BY MICHAEL COONEY

Raleigh, N.C.

Let the channel wars begin.

After months of anticipation, Cisco Systems, Inc. last week announced an adapter that lets users attach the firm's high-end router to mainframe channels.

The new Channel Interface Processor (CIP) fits in a slot on Cisco's 7000 router and supports TCP/IP-based links to a 4.5M byte/sec bus and tag channel or to fiber-optic Enterprise System Connection (ESCON) channels at up to 17M byte/sec.

"For the first time, the mainframe is now a full-fledged member of the internetworked enterprise," said Nick Francis, director of IBM programs for Cisco.

CIP employs technology that Cisco licensed from IBM's Large Scale Computing Division earlier this year (*NW*, Jan. 10, page 11). The agreement incensed IBM's Network Systems Division, which has campaigned against channel-attached routers ever since (*NW*, Sept. 12, page 1).

"There's a lot of pressure on both firms to succeed in the channel market," said Fred McClimans, a principal with the Decisis, Inc. consultancy in Herndon, Va. "The big questions will be, can Cisco use CIP to wrestle big-name accounts from IBM, and if so, will they be able to service them like IBM?"

Each CIP supports two mainframe channel connections. A total of four CIPs offering eight channel connections can be supported from one Cisco 7000 router. The CIP uses an on-board R4600 100-MHz Reduced Instruction Set Computing (RISC) CPU to process incoming data.

The CIP appears to the mainframe as a channel-attached 3172 controller and routes incoming TCP/IP traffic to TCP/IP-based applications on the mainframe. It works in conjunction with IBM's TCP/IP for MVS and TCP/IP for VM, as well as Interlink Computer Sciences, Inc.'s TCP/IP for MVS software.

Also, Proginet Corp. said its Systems Network Architecture, Novell, Inc. NetWare and TCP/IP file-transfer products for the MVS mainframe will work with the CIP in the future.

Cisco is billing CIP as a replacement for IBM's 3172 Interconnect Controller. Francis said the CIP triples the LAN throughput of the 3172, eliminating a bottleneck for users with lots of TCP/IP traffic to the mainframe.

The CIP can also obviate the need for some LAN-to-mainframe gateways that require use of a front-end processor (FEP), Francis said.

SNA SUPPORT

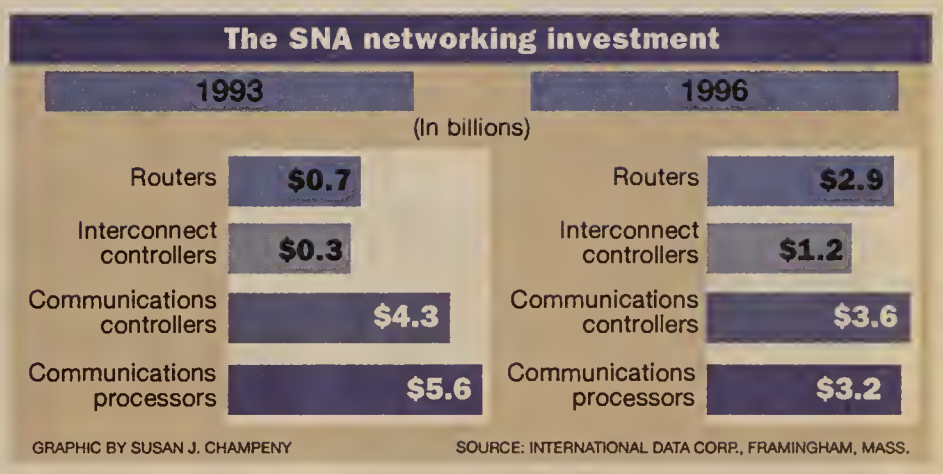
While Cisco is targeting 3172 users with this release, it expects to go after the FEP market in March when it adds SNA support to CIP. The company will also add a TCP/IP off-load feature to the adapter in the same time frame, enabling it, instead of the mainframe, to handle TCP/IP communications functions. Support for Advanced Peer-to-Peer Networking is also on tap for 1995.

"If users have multiple mainframes, 3475s and a lot of SDLC lines, they likely won't want to go the 7000/CIP route right away," Francis said. "Once we add SNA and APPN, however, we feel we'll have the power and options to give users a solid alternative to a FEP."

The CIP can be managed by any industry-standard Simple Network Management Protocol, such as IBM's NetView for AIX (the former NetView/6000) or Hewlett-Packard Co.'s OpenView. It can also be handled by IBM's host-based NetView platform using a 7000 feature that translates SNMP messages into a NetView-compatible format.

CIPs will be available in December. Single- and dual-port parallel channel adapters will cost $28,000 and $35,000, respectively, while single and dual-port ESCON versions will run $40,000 and $59,000. A combination ESCON and parallel adapter will cost $49,000.

✆Cisco: (800) 553-6387.



BRIEFS

Microcom, Inc. today will announce two low-priced 28.8K bit/sec modems. The TravelCard 28.8P is a **PCMCIA modem** that incorporates Microcom's Advanced Parallel Technology (APT) for compressed data throughput of up to **300K bit/sec.** The other new modem, the DeskPorte 28.8S, does not support APT.

Available later this month, the modems will cost $399 and $279, respectively. Upgrades to the final V.34 modem standard will be available for $99 and $39, respectively.

Microcom: (617) 551-1000.

Eicon Technology Corp. last week introduced the **InterConnect Gateway for NetWare,** a server-based gateway that connects NetWare LANs and Systems Network Architecture devices to IBM and other hosts over frame relay links.

Available now, the InterConnect Gateway costs $1,995 for an unlimited number of users.

Eicon: (800) 803-4266.

Motorola, Inc.'s Network Systems Division last week introduced an **ISDN Basic Rate Interface** module for its **6520 Multimedia Periphery Router.** The ISDN module supports one BRI connection, multiplexing the two B channels to provide 128K bit/sec throughput. It also supports one 16K bit/sec D channel for packet-switched access to X.25 nets.

The ISDN module also supports a new bandwidth-on-demand feature. When the 6520 Multimedia Periphery Router's primary link exceeds a congestion threshold for IP traffic, this feature brings up an ISDN connection for additional bandwidth. When the congestion clears or the session ends, the link is dropped.

The module will be available before the end of this year. Pricing will start at $945.

Motorola: (508) 261-4000.

Showdown on the desktop

Available desktop video systems that work over TCP/IP-based LANs and WANs.

Product	Platforms	Picture quality	Pricing
InSoft, Inc.'s Communique	Sun SPARCstation, HP 9000, Digital Alpha	Excellent	$2,000 software only
InVision Systems Corp.'s InVision	486-based PC or higher running Windows	Good	$595 software only
Viewpoint Systems, Inc.'s Personal Viewpoint	386-based PC or higher running Windows	Fair	$1,695 for codec and software

TCP/IP holds no guarantee of interoperability in desktop video

BY ELLEN MESSMER

From a distance, it all looks like TCP/IP-based desktop videoconferencing, but look closer and you will see big differences in available products that work over LANs and WANs.

Desktop systems for packetized audio and video are still cutting-edge, and InSoft, Inc., InVision Systems Corp. and Viewpoint Systems, Inc. are leading the charge with TCP/IP-based products that let users take advantage of installed LANs and wide-area links such as frame relay. But even though all three products rely on TCP/IP for transport, do not assume they are interoperable — they're not.

In fact, there are more incompatible TCP/IP-based video products on the way early next year from vendors including Intel Corp., PictureTel Corp., Unisys Corp. and RAD Vision, Inc.

InSoft's partnerships with Sun Microsystems, Inc., Hewlett-Packard Co. and Digital Equipment Corp. have produced the closest thing yet to interoperability in packet video. Sun, HP and Digital all sell a version of InSoft's Communique software for their respective computers that are interoperable with one another (see graphic).

Communique is also being ported to the IBM RISC System/6000 and Windows-based 486 PCs, with shipping dates not yet released.

Communique video works at up to 30 frame/sec, consuming a maximum 1.5M bit/sec of bandwidth on a token-ring or Ethernet LAN. InSoft has an application for diminishing network speed, if needed. As many as 10 remote locations can be supported simultaneously with the InSoft multipoint bridge.

InSoft ships data-sharing and whiteboard software with Communique. The software alone costs about $2,000 per desktop, while a full conference kit with video card, microphone and camera costs about $4,500. It's not inexpensive, but the picture quality is remarkably good, judging from product demos.

VIDEO FOR THE MASSES?

InVision has likewise worked to ensure a measure of interoperability by testing its packet video software for compatibility with over a dozen codec boards for video capture.

For use on 486-based PCs, InVision software works point-to-point at up to 20 frame/sec, consuming up to 512K bit/sec of bandwidth on a LAN and up to T-1 on the WAN. It comes with InVision's Visual Reference document-sharing software.

InVision software lets users decide whether they want to accept an incoming TCP/IP-based video call, something that InVision President Jim Geddes calls "Caller I.D. for video on the Internet."

Picture quality is good, but hardly cinematic. But at $595, video for the masses is starting to look possible.

Viewpoint Systems' Personal Viewpoint product uses TCP/IP only for the video and data-sharing part of the conference; the audio portion is dependent on a standard phone line.

It operates between 56K and 640K bit/sec at up to 30 frame/sec. Currently, the software only runs point-to-point on a 386-based PC or higher, but a multipoint system for as many as four users is under development with partner Future Labs, Inc.

However, Viewpoint's picture quality is uneven, with images sometimes wavering on-screen like Captain Kirk in the Enterprise's transporter. "Our new board will have better quality," said Jim Zimmerman, product development software engineer.

✆InSoft: (717) 730-9501; InVision: (918) 584-7772; Viewpoint Systems: (214) 243-0634.

ATM Or Frame Relay? Both.

Are you looking for a frame relay service to interconnect your LANs? Concerned about finding a migration strategy to ATM? You can now have both — the economy of frame relay and the speed and agility of ATM — all in one network. With MFS Datanet's new Frame Transport services and extensive ATM network, you'll be ready for a wide range of bandwidth demands in the future, such as high-speed LAN interconnections or multimedia applications. All without the usual problems of costly upgrades.

Frame Relay's economy and convenience now, or ATM's capabilities and future needs? The answer is... both.

Call MFS Datanet at 1-800-MFS-4USA or 408-975-2200.

MFS DATANET

© Copyright 1994, MFS Communications Company, Inc.

All the best rides onto the network are brought to you courtesy of AT&T Paradyne. With the broadest range of access products in the world. And with backup as big as AT&T itself. Backup like NetCare,® the program that may well be the most comprehensive aftercare service ever offered. By anyone. Anywhere. As for interconnectivity and future migration, no one gives you a better entree to the networks of tomorrow than AT&T Paradyne. It's access as only AT&T can do it.

Access the Globe.

For access, access and more access, call 800 482-3333, extension 322.

ISO 9001 CERTIFIED

AT&T Paradyne

©1994 AT&T. NetCare is a registered service mark of AT&T.

Some people buy our Token-Ring adapters for price alone. What a pity.

Our adapters perform near wire speed. Call to arrange a test-drive.

We use our own specially designed silicon for higher quality and performance.

EliteSwitch ES/1

Elite Intelligent MAU

SMC's complete networking solutions include LAN switches, LAN adapters, hubs and network management software.

At only $249 for a TokenCard Elite adapter when purchased in a 50-pack, you'll protect your Token-Ring investment without breaking your budget.

Industry-leading support and service makes us a network's best friend.

Our Token-Ring EISA card gives superior performance and reliability. And at $379 per adapter, it's 35% less than the competition.

COMPAQ Qualified Solution

RECOMMENDED PRODUCT

yes NetWare Tested and Approved

NSTL

Look beyond the remarkable low price of our TokenCard Elite™ adapter and you'll find some things that are even more remarkable. Like an adapter card that's fully software configurable. Fully compatible with IEEE 802.5 standards. 100% interoperable within IBM environments. And backed with a lifetime warranty.

SMC LIFETIME WARRANTY

What's more, with each adapter you purchase, you get the support, service and recognized networking expertise of SMC. It's an expertise that can provide network solutions from desktop to enterprise.

For information on our Token-Ring solutions and a free adapter evaluation kit, call 1-800-SMC-4-YOU Dept. TA06.

So phone today to order your TokenCard Elite adapters. And you'll discover their high points include far more than a low price.

SMC®
SWITCH ON THE POWER

The Complete Token-Ring Solution.

ADAPTERS • MAUs • LAN SWITCHES • NETWORK MANAGEMENT

U.S. dollars. All trademarks and registered trademarks are the property of their respective holders. NSTL makes no recommendation or endorsement of any product. *Infoworld* "Recommended Product" seal awarded June, 1993 to TokenCard Elite adapters. © 1994 Standard Microsystems Corporation.

❒ ***Yes!*** I need to consolidate my SNA and LAN networks.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone ( ) _____

Protocols in use:

❒ SNA
❒ Bisynch
❒ Novell SPX/IPX
❒ Other _____
❒ Asynch
❒ X.25
❒ TCP/IP
❒ NetBIOS

LAN topologies installed?

❒ Token Ring
❒ Ethernet ❒ Other _____

Host system installed?

❒ AS/400 or S/36, S/38 ❒ IBM Mainframe
❒ DEC VAX ❒ Other _____

Type of industry _____

HYPERCOM
Network Systems

For more information, return this card or call: 1-800-577-5501, Fax: (602) 548-2166

NW 10/17/94

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 14196 PHOENIX,AZ

POSTAGE WILL BE PAID BY ADDRESSEE

HYPERCOM

Hypercom Network Systems
2851 West Kathleen Road
Phoenix, Arizona 85023-9903

SNMP MANAGEMENT

ACC's RiverView lets users map, monitor router nets

BY JIM DUFFY

Cupertino, Calif.

Advanced Computer Communications (ACC) last week rolled out a new network management system that allows users to remotely monitor and configure the company's line of internetworking products using SNMP.

The system, called RiverView, is based on SNMPc from Castle Rock Computing, Inc. It operates on any 33-MHz Intel Corp. i386 personal computer with 8M bytes of random-access memory and a 40M-byte hard drive.

RiverView automatically discovers and maps ACC's Tahoe, Danube, Amazon, Nile, ACS4200 and ACCess/4500 bridge/routers — as well as other Simple Network Management Protocol-capable devices — on a Windows graphical user interface. Unique icons are presented that identify the ACC routers.

All network maps are hierarchical so individual icons can represent departmental nets, remote office sites and metropolitan-area nets. Maps can also be set up to show segments or domains controlled by different RiverView management systems.

Take me to the RiverView

Features of ACC's RiverView management system:

- Windows-based network management.
- Provides images of devices and point-and-click menus.
- Real-time and historical graphs and charts of event data.
- Alarms can be sent to pagers and logged in event files.
- Central management of router configuration files.

From the Windows interface, managers can click on any icon on the network map to call up configuration information, performance statistics, traffic data according to protocol, and other critical data.

Double clicking on any router icon will launch a bit-mapped image of the physical layout of the router, identifying the I/O ports on the device and highlighting active ports in green and inactive ports in red.

PICKING FROM THE MENU

Above each router display is a point-and-click pull-down menu that provides access to ACC's Display commands, which show both SNMP Management Information Base (MIB) II variables and ACC's specific MIB variables. In all, more than 4,000 variables can be displayed and examined in real-time tables, bar charts or graphs.

RiverView also includes a MIB compiler so third-party MIBs can be added to and supported by the system.

For configuration management, RiverView includes an application, called CLI4000, that allows network managers to remotely set up any ACC router. Configuration files can be stored at the RiverView workstation, and new or updated files can be sent to a router's flash memory via a TCP/IP File Transfer Protocol session.

The configuration capabilities of RiverView are comparable to Cisco Systems, Inc.'s Point-and-Click Internetworking offering and Hewlett-Packard Co.'s Network Configuration Manager. But RiverView is more all-encompassing, analysts said.

"[Cisco's Point-and-Click Internetworking] is just to get the network up and running; it's not a real management utility," said Glenn Gabriel Ben-Yosef, an analyst with The Yankee Group in Boston. "RiverView goes one step further."

Once routers have been configured, their real-time operating conditions can be monitored via health meter gauges. Green, yellow and red regions of the meter indicate the status of each MIB variable, displaying current and peak values in order to establish a performance threshold for each variable.

Once the threshold has been established, alarms can be set to indicate when conditions exceed a level deemed healthy for the network.

When an SNMP event triggers an alarm, network managers can create scripted responses to log the event, sound an audio signal, cause the icon on the map to change color, send an electronic mail message or signal a pager.

Logged events are prioritized in the log file and can be displayed using user-selected filters.

A summary of the log file can also be displayed graphically to show network trends and historical records of network data throughput.

RiverView also includes a "ping" feature to determine whether a router is active as well as a route tracer to find faults when routers do not respond to a ping.

RiverView costs $1,895. It will ship Oct. 21.

©ACC: (408) 366-9600.

INSTANT CONSOLIDATION.

Combining SNA and TCP/IP traffic on a consolidated network has been both difficult and risky...until now.

Presenting the Hypercom® **Integrated Enterprise Network**™, a protocol independent networking solution where fast growing LAN traffic does not choke off existing mission-critical applications, and higher priority SNA traffic does not monopolize bandwidth. The result is flexible, seamless integration of SNA, bisynch, Ethernet and Token Ring across a single WAN.

Based on Hypercom's unique "Virtual Mapped SNA" technology, the Integrated Enterprise Network offers:

- **Superior response times**
- **Efficient packet-based solution**
- **"Touch and feel" of leased line network**
- **Elimination of wasted bandwidth**
- **No time-outs or session drops**
- **Reduced equipment and telco costs**
- **Future support of IBM's APPN**
- **Frame relay support**

With Hypercom, your legacy IBM networks and PC/LAN networks can now be merged into a single, manageable internetworking resource.

Call Hypercom to receive our **FREE** application brief *"Multiprotocols and SNA Routing Over Frame Relay,"* and to find out more about IEN solutions for integrated branch connectivity.

1-800-577-5501

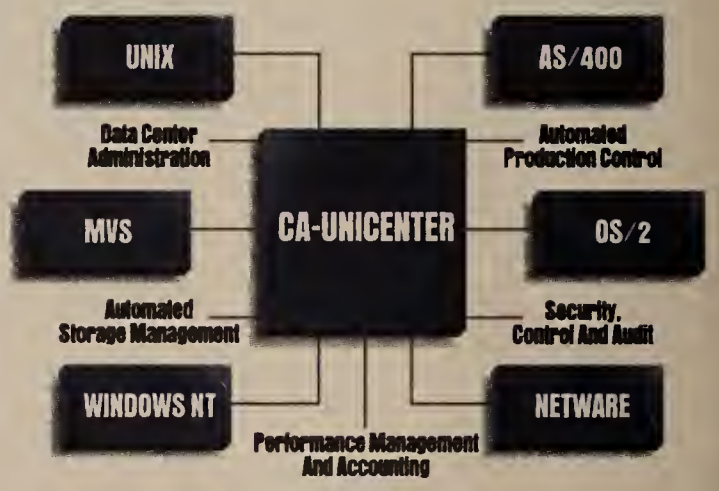
HYPERCOM® Network Systems

SNA Internetworking Without Compromise.

© 1994, Hypercom®, Inc. • Corporate Office: 2851 West Kathleen Road, Phoenix, Arizona 85023 • (602) 866-5399, Fax: (602) 548-2166

Presenting The 7
Of Systems Mana

1 Replace Disparate Point Products With A Single, Integrated, Comprehensive Solution.



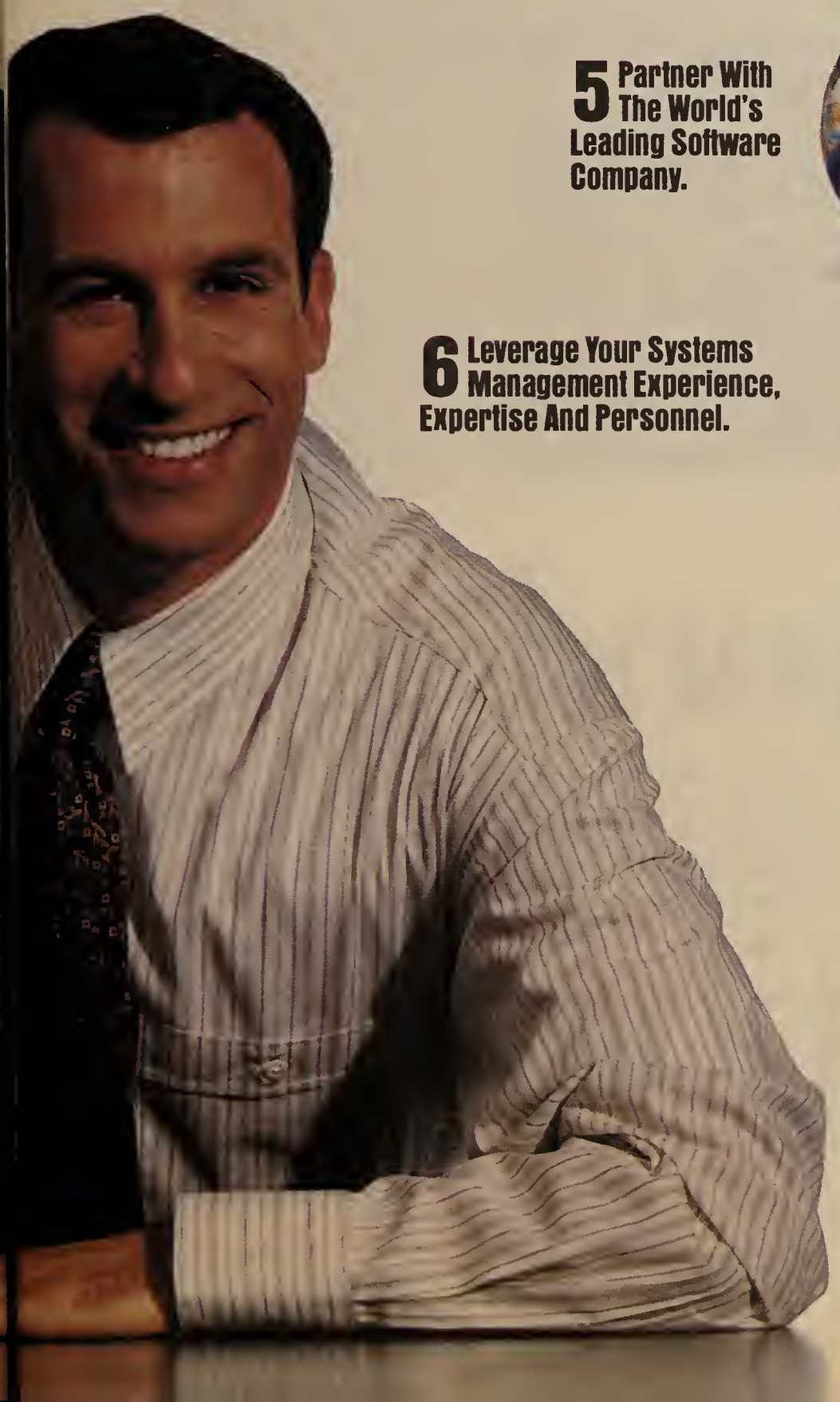
2 Choose A Client/Server Application That's Interoperable, Scalable and Portable.

3 Demand An Open Solution That Supports All Key Industry Standards And Protocols.

COMPUTER ASSOCIATES®
Software superior by design.

Commandments gement Software.

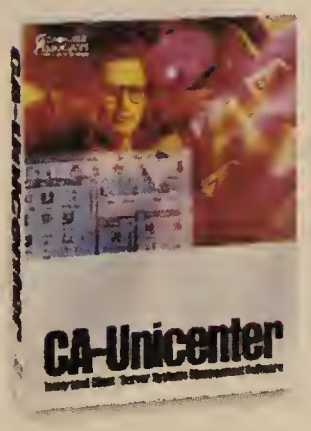
4 Standardize On A Common GUI Interface That Makes It Easier To Use. Reduce Training Costs And Boost Productivity.



5 Partner With The World's Leading Software Company.

6 Leverage Your Systems Management Experience, Expertise And Personnel.

7 Protect All Your Data With Bulletproof Security Software That Supports Every Platform And Operating System Across Your Entire Enterprise.



When choosing your systems management software, you shouldn't have to make a leap of faith. And with new CA-Unicenter,® you don't have to. Because CA-Unicenter is the single, integrated systems management solution that solves all of the challenges of managing client/server computing across heterogeneous platforms.

So call today for more information about the systems management software you can believe in: CA-Unicenter.

Call 1-800-225-5224 Dept. 10111 For More Information And To Register For The CA-Unicenter Software Giveaway.

CA-Unicenter®

Integrated Client/Server Systems Management Software

© Computer Associates International, Inc., Islandia, NY 11788-7000. Offer good in U.S. and Canada only. All other product names referenced herein are trademarks of their respective companies. Requirements for Software Giveaway available through toll-free number.

by Scott Bradner

The view from Mexico City

I have just returned from Mexico City and the "Simposium de Telecomunicaciones" and am a bit disappointed, but not all that surprised, by a few of the things I heard there.

I found people expressing the same view of the future of national and international data communications as some in this country — that of discrete sand piles.

One of the presenters spoke glowingly of the data network services model exemplified by the French Minitel network. This is a low-speed (2,400 bit/sec) dial-up network of five million users and more than 12,000 on-line services that in 1990 logged over 85 million hours of connect time.

Billboards in the Paris subways display Minitel numbers so you can order concert tickets and much more through its services.

This is rather impressive in comparison to the Internet and might give us a hint as to the potential popularity of good, easy-to-use data services. One out of 11 French citizens has a Minitel terminal, and the usage is more than 1.5 hours per citizen per year.

Projecting this rate of acceptance and usage onto the U.S. population would mean more than 20 million users and 375 million hours of connect time.

The problem with Minitel is that it is basically a closed network — sort of like someone buying a TV set that only receives HBO. Sure, it's useful, but a more open system that is a fully integrated part of a global Internet would be much more so.

I saw a tendency toward this same sort of thinking during the Information Superhighway Summit last month in San Jose, Calif. Attendees kept returning to the question of what was going to become the Information Superhighway.

The options were the cable TV network, the telephone network and the Internet. I gave a presentation that claimed the proof of concept for the National Information Infrastructure's (NII) was already here and is called the Internet.

One of the powers of the Internet is that it is not selective in the transports it requires. It already runs over telephone links and will run over just about anything else including the cable TV nets.

Someone even claimed on one of the Internet mailing lists that TCP/IP could run over carpet static.

I saw one problem during the conference, namely that too many of the people involved in these efforts seem to think that they should build their own highways — highways that may have limited interconnections with each other and the existing Internet.

This type of feeling is not limited to people trying to plan the NII, but also seems to have contaminated many of those companies trying to enter this data networking business.

All too many of them are setting up their own private networks that offer some set of functionality rather than figuring out how to offer the same functionality over the Internet, making the infrastructure richer and more attractive.

I expect that many of these ventures will be quite successful, as many have been in the past. Compuserve, from what I hear, is doing fine. I don't doubt that more companies will also do well.

However, I do not think that this sort of fragmentation is a good long-term strategy for any of the players. The building of this type of private sandbox is probably inevitable but nonetheless lamentable.

P.S. My admiration for the inventiveness of the engineers who work for the airlines was reinforced during my trip to Mexico City. I took vertebrate biology when I was in college and, even though it was quite a while ago, I do not remember any part of a chicken that quite resembles what we were served as a food substitute. It is truly amazing what can be accomplished by inventive minds.

Disclaimer: Above opinions != Harvard's.

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

Introducing Version 4.0

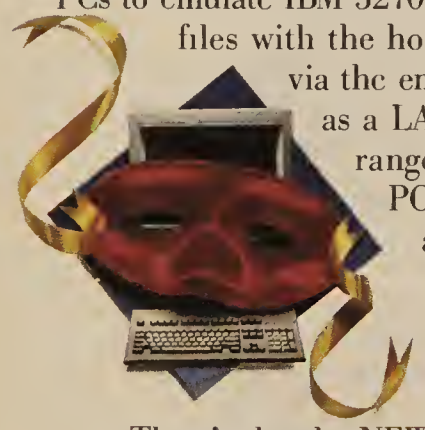
Personal Communications/3270

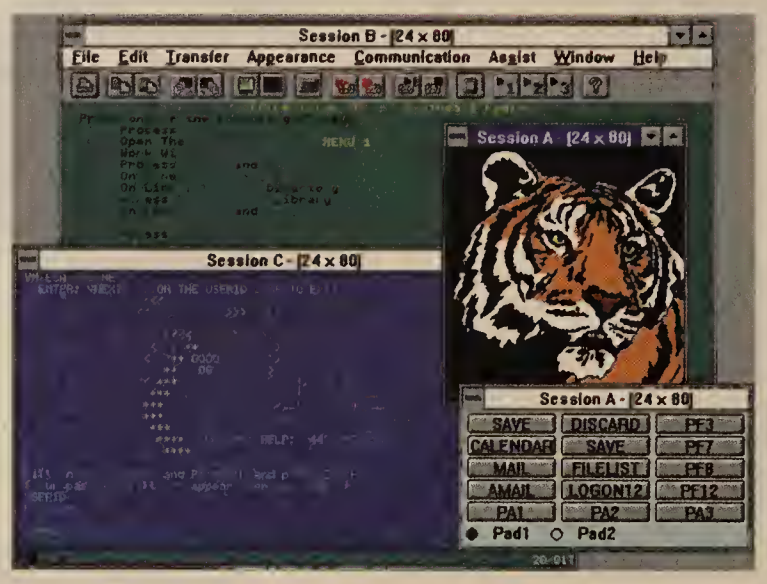
Emulation beyond expectation.

Make a list of everything an emulator should be. Then add a few more lines. With the IBM® Personal Communications/3270 V.4.0, you can have it all–and more.

Power and Flexibility.

Now you can access the host mainframe from more locations, more efficiently and with more function than ever before. Running as a native DOS or Windows™ application, IBM PC/3270 allows PCs to emulate IBM 3270 display terminals, transfer files with the host, automate process via the emulator APIs, and function as a LAN gateway. With its wide range of connectivity, IBM PC/3270 is also quite a liberator. There's support for IPX/SPX (NetWare® for SAA®), TCP/IP, and Async support for out-of-office connectivity.





Take a look at all that PC/3270 has to offer, and you'll see why it's the latest emulation sensation.

There's also the NEW Personal Communications Toolkit for Visual Basic,® which makes it easier for Windows programmers to integrate host data and text with workstation applications.

Great Support and Savings.

You'll also find all the support you need for the latest technologies, including the latest modems (V.32BIS and V.42BIS) and PCMCIA credit card adapters. And there are lower upgrade prices when you decide to migrate from non-IBM (Attachmate,® DCA,® Wall Data,® etc.) or IBM 3270 terminal emulators. To find out more, call 1 800 342-6672. In Canada, call 1 800 465-7999, ext. 999. With so many features, the PC/3270 is clearly greater than your average emulator.

IBM and SAA are registered trademarks of International Business Machines Corporation. NetWare is a registered trademark of Novell Inc. MS-DOS and Visual Basic are registered trademarks and Windows is a trademark of Microsoft Corp. DCA is a registered trademark of Digital Communications Association, Inc. Attachmate and Wall Data are registered trademarks of their respective companies. © 1994 IBM Corp. All rights reserved.

IBM®

Point Your Network In The Right Direction.

Planning the future of your network? The solution has never been so clear. Choose the network integrator with the expertise and dependability to make your network solutions happen cost effectively, correctly, and on time. That's why IBM® selected Centron as the 1993 IR National Solutions Provider of the Year.

And the IBM 8260 Intelligent Switching Hub is the clear choice for network switching and media management. Featuring integrated ATM technology, higher port densities, fault tolerance, and port switching, the IBM 8260 is a true industry leader. For the best in networking solutions, call Centron.

CENTRON

Network Solutions

1-800-532-7532

IBM Business Partner

IBM is a registered trademark of the International Business Machines Corporation.

Look for us on all the major networks.

Word about PCs from Hewlett-Packard is getting around, and ratings are soaring. According to a recent CRN/Gallup survey, "Use of HP desktops in Fortune 1000 companies has doubled in the last year."‡

And with good reason. Our broad range of PCs not only meets users' expectations for power and ease of use, it also answers the needs of a network manager. With built-in features like on-board networking, advanced security and asset tracking, HP PCs have what it takes to be top performers on virtually any network. And soon our expertise in network management will reach all the way to the desktop, as we continue to pioneer the development of DMI (Desktop Management Interface).

For more information or the name of your nearest HP dealer, call us today at 1-800-322-HPPC, Ext. 8567. And tune in to the network superstars.

HEWLETT® PACKARD

Give your other PCs something to look up to.

If you're connecting PCs to a network, scan this chart and you'll see it's time to hook up with HP.

STANDARD NETWORKING FEATURES	HP VECTRA XM2 PC	HP VECTRA M2 PC	COMPAQ DESKPRO/XE	DELL NETPLEX
Advanced Bus Architecture	PCI	VL		
Integrated Networking Interface	32-bit	16-bit		
Integrated, multiprotocol Boot-ROM	X	X		
ISA Plug-n-Play Compliant	X	X	X	
Multilevel Security Features	X	X	X	X
Asset tracking	X	X	X	
PC tattooing	X	X	X	
Optional Desktop Management Software	X	X		
Bi-directional parallel port	X	X	X	X
Desktop Management Interface (DMI)[3]	X	X		

HP Vectra VL2

HP quality in value-priced PCs.

- *Intel 33-MHz 486SX, 50- and 66-MHz 486DX2 100-MHz DX4, upgradable to Pentium Overdrive; Intel 60-MHz Pentium*
- *Chip upgrades to higher performance*
- *On-board accelerated local-bus video*
- *210-MB hard drive[1]*
- *4-MB RAM, expandable to 64-MB*
- *512 KB or 1 MB of Video RAM standard*
- *ISA Plug-n-Play compliant*
- *Desktop Power Management*

- *EPA Energy Star certified*
- *Local bus Fast-IDE hard disk interface**
- *1280 x 1024 video resolution**
- *Optional 128- or 256-KB cache memory**
- *Free three-year limited warranty for parts and labor[2]*

from
$1,049†

HP Vectra N2

High-performance network-ready PCs in a slimline package.

- *Intel 33-MHz 486SX, 50- and 66-MHz 486DX2, upgradable to Pentium Overdrive*
- *Optional 128- or 256-KB second level cache*
- *210-MB, 14-ms Fast-IDE hard drive[1]*
- *32-bit Fast-IDE local-bus hard disk interface*
- *8-MB RAM, expandable to 96-MB*
- *Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution*

NEW!

- *1 MB of video RAM standard, expandable to 2 MB*
- *Slimline package with two mass storage shelves and three ISA slots*
- *Optional integrated 10Base-T networking*
- *Multilevel security*
- *EPA Energy Star certified*
- *ISA Autoconfiguration utility (Plug-n-Play)*
- *Integrated Desktop Management Interface (DMI)[3]*
- *Free three-year limited warranty for parts and labor[2]*

from
$1,429†

HP Vectra M2

High-performance PCs for the connected office.

- *Intel 33-MHz 486SX; 50- and 66-MHz 486DX2, 100-MHz DX4, upgradable to Pentium Overdrive*
- *Optional 128- or 256-KB second level cache*
- *Four mass storage shelves; four expansion slots*
- *One available 32-bit VL-bus slot*
- *210-MB, 14-ms Fast-IDE hard drive[1]*
- *32-bit Fast-IDE local-bus hard disk interface*
- *8-MB RAM, expandable to 96-MB*

NEW!

- *Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution*
- *Optional integrated 10Base-T networking*
- *Systems Diagnostics Utility*
- *EPA Energy Star certified*
- *ISA Autoconfiguration utility (Plug-n-Play)*
- *Integrated Desktop Management Interface (DMI)[3]*
- *Free three-year limited warranty for parts and labor[2]*

from
$1,509†

HP Vectra XM2

Exceptional 486 performance for advanced business use.

- *Intel 50- and 66-MHz 486DX2, 100-MHz DX4, upgradable to Pentium Overdrive*
- *PCI architecture*
- *Standard 256-KB second level write-back cache*
- *Four mass storage shelves; four expansion slots*
- *Two available 32-bit PCI expansion slots*
- *210-MB, 14-ms Fast-IDE hard drive[1]*
- *32-bit PCI IDE hard disk interface*

NEW!

- *8-MB RAM, expandable to 96-MB*
- *PCI Integrated 64-bit S3 Vision-864 graphics accelerator supporting up to 1280 x 1024 resolution*
- *Optional PCI Integrated 32-bit 10Base-T networking*
- *Integrated Desktop Management Interface (DMI)[3]*
- *EPA Energy Star certified*
- *Free three-year limitcd warranty for parts and labor[2]*

from
$2,069†

HP Vectra XU

The ultimate PC for advanced business and technical applications.

- *Intel 90-MHz Pentium Processor*
- *Second processor socket for MP Spec 1.1 multi-processing*
- *Standard 256-KB second level asynchronous or burst asynchronous write-back cache*
- *PCI architecture*
- *Four mass storage shelves (three front accessible); five expansion slots*
- *Two available 32-bit PCI expansion slots*
- *270-MB, 12-ms Fast SCSI-2 hard drive[1]*

NEW!

- *Integrated 32-bit PCI SCSI-2 interface*
- *PCI integrated 64-bit S3 Vision-864 graphics with 1280 x 1024 resolution or PCI MGA Ultima Plus graphics with up to 1600 x 1200 resolution*
- *32-bit PCI IDE hard disk interface*
- *8 or 16 MB of RAM, expandable to 256 MB*
- *PCI Integrated 32-bit 10Base-T networking*
- *Integrated Desktop Management Interface (DMI)[3]*
- *Free three-year limited warranty for parts and labor[2]*

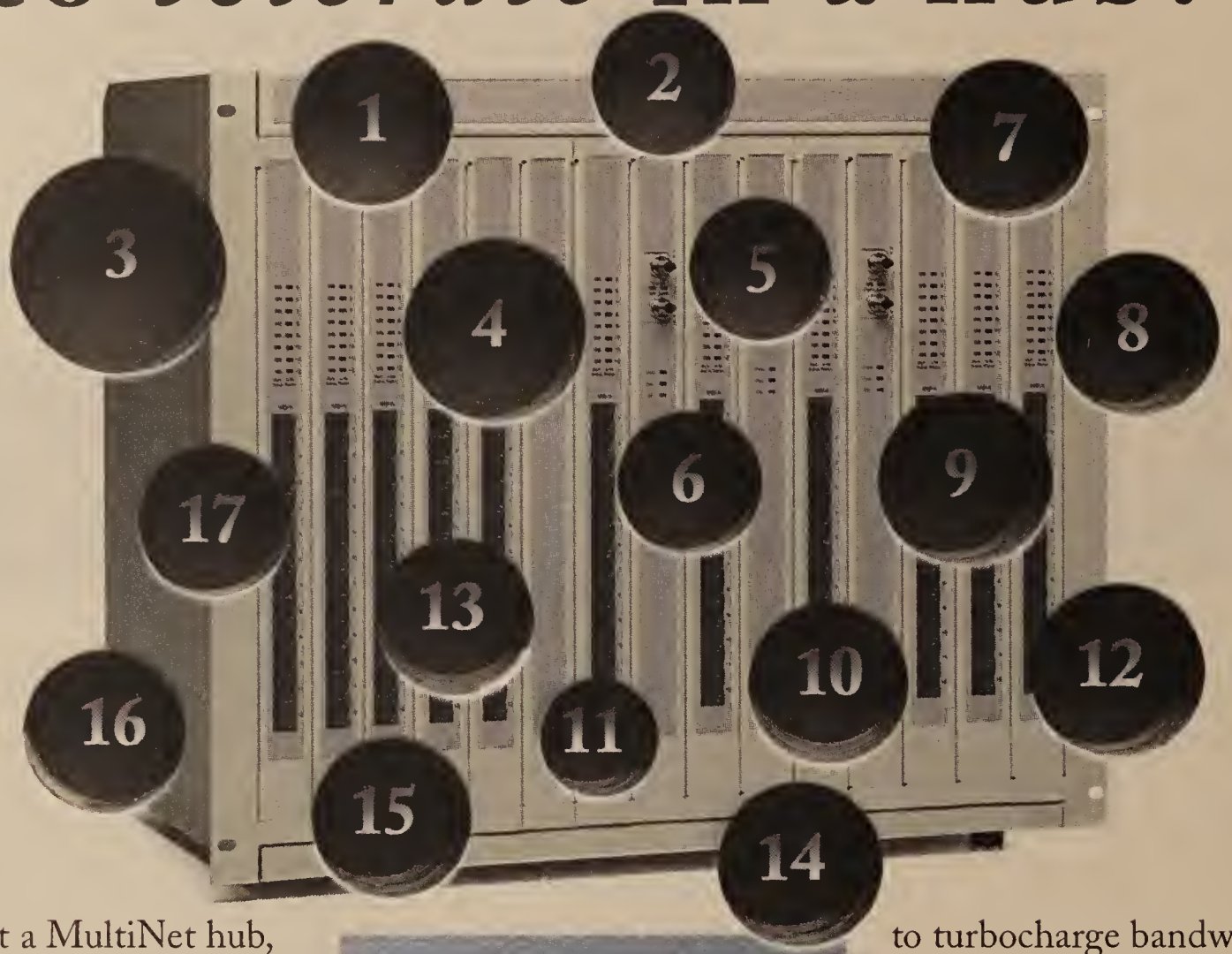
from
$3,749†

intel inside

yes NetWare Tested and Approved

All HP Vectre PCs come with MS-DOS® 6.2 and MS Windows for Workgroups 3.11 pre-installed; HP mouse end keyboerd included. *Feeture included with some models. †U.S. list price, deeler prices mey very. Monitor not included. [1]Other capecities evaileble. [2]First year on-site, 24-hour service. Second end third year return to deeler. [3]Available 10/1/94. ‡With permission CRN/Benchmark. MS-DOS is e U.S. registered tredemark end Windows is a trademark of Microsoft Corporetion. Pentium and the Intel Inside logo are U.S. tredemerks of Intel Corporetion. PPG407 ©1994 Hewlett-Peckerd Company

How many faults are you willing to *tolerate* in a hub?



Unless you get a MultiNet hub, start counting. Because it's the only hub that offers fault tolerance at every point of potential failure — a total of 17 features. (Most "fault-tolerant" hubs offer just one or two.) So you can be confident your network and business are always up, and you keep that competitive edge. And you can configure MultiNet any way you want: dynamic Ethernet switching

OTHER HUBS ARE FULL OF HOLES. ONLY MULTINET COVERS EVERY POINT OF POTENTIAL FAILURE.

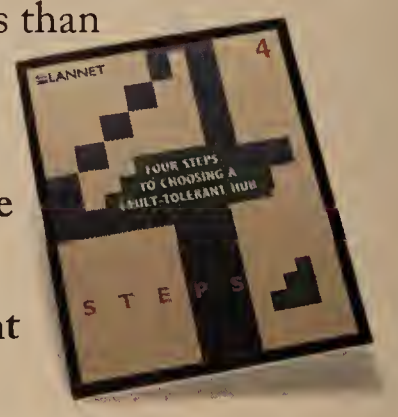
HUB ARCHITECTURE
1. H/W-based real-time fault tolerance
2. Distributed repeaters
3. Hot swappable modules
4. Redundant hub buses
5. Distributed h/w-based switching fabric
6. Back-up power supplies
7. Token Ring speed detection

BACKBONE LINKS
8. Redundant backbone link ports
9. Software-configured redundant hub links
10. Redundant WAN bridge/router links

LINKS TO NODES
11. Redundant ports
12. Plus Mode monitors both sides of link
13. Synchronous Ethernet
14. Transceivers support redundant links

NETWORK MANAGEMENT
15. SNMP agent reports to multiple stations
16. Distributed configuration information
17. Out-of-band network management

to turbocharge bandwidth, plus Ethernet, Token Ring, FDDI and internetworking. Don't tolerate anything less than 100% fault tolerance. **Get the guide to building fault-tolerant networks.**



CALL 800-778-7427, dept. 124. Or send an e-mail to networld2@hq.lannet.com

LANNET

The Open Framework for Network Solutions.

yes It runs with NetWare

17942 Cowan Avenue, Irvine California 92714 ©1994 LANNET. MultiNet's a registered trademark of LANNET. All other trademarks are sole property of their respective companies. Developer tested only. Novell makes no warranty with respect to this product.

LAN WORLD

A Special Monthly Section for LAN Decision Makers

INSIDE LAN WORLD

- **Troubleshooting TCP/IP-based** internetworks using a layered approach. Page L2.
- **Enhanced gateway protocols** increase appeal of AppleTalk on backbones. Page L8.
- **Spry's Internet connectivity** tool and Intel's PCI bus are generating discussion on the Windows Connectivity Forum. Page L8.
- **Users of** On Demand's WinInstall find it cuts Windows application deployment from days to hours. Page L13.
- **HP has new** optical and tape backup systems in store. Page L17.
- **Quarterdeck software** lets Windows users get in on Unix LAN action. Page L18.
- **Columnist Mark Gibbs** lambastes unintuitive graphical user interfaces. Page L19.

Grand Junction unveils the first stand-alone fast Ethernet repeater

FastHub 100 is based on the 100Base-T draft specification.

BY SKIP MACASKILL

Fremont, Calif.

Grand Junction Networks, Inc. last week became the first vendor to offer users a stand-alone fast Ethernet hub when it unveiled a repeater based on the 100Base-T draft standard for running Ethernet at 100M bit/sec.

The new FastHub 100 offers 16 fast Ethernet ports that can be used to support high-end workstations, workgroups and servers.

The hub can also be used as a LAN switch aggregation point, acting as a 100M bit/sec backbone to link several Ethernet switches. For example, if two FastHubs are daisy-chained together, they can support as many as 30 Grand Junction FastSwitch 10/100 devices, which offer 10M and 100M bit/sec dedicated connections to the desktop.

While the 100Base-T standard encompasses several wiring types, the FastHub 100 will support the 100Base-TX specification that uses two pairs of Category 5 unshielded twisted-pair wiring. The device acts in the same way as a standard 10M bit/sec Ethernet repeater, but it provides 10 times the speed at each port.

The hub is interoperable with Grand Junction's entire line of products, which includes fast Ethernet adapters and a combination Ethernet LAN switch that supports 10M and 100M bit/sec switched connections to the desktop. In addition, FastHub works with Intel

See **Grand Junction**, *page L9*

Reality Check

Product: FastHub 100
Company: Grand Junction

The benefits:
- First 100M bit/sec Ethernet hub available.
- Interoperates with LAN adapters from Intel and Sun.

The drawback:
- No routers support the technology, so use is limited to local environments.

The user view:
"All you do is turn it on. There is no configuration at all."

Roger Salisbury

BRIEFS

The **Desktop Management Task Force (DMTF)** last week announced the completion of the **LAN adapter Management Information Format (MIF)** file, which will help users manage their adapter cards in a uniform way and cull more detailed performance monitoring information. Data captured in the MIF file can be ported to a variety of management applications through the DMTF's Desktop Management Interface.

DMTF: (503) 696-9300.

UB Networks, Inc. last week announced it will partner with **Frontier Software Development, Inc.** to jointly develop Remote Monitoring (RMON) products for LAN- and Asynchronous Transfer Mode-based switches. Under terms of the agreement, UB will also resell Frontier's entire product line, which includes hardware probes, RMON agent software and front-end software applications, and incorporate Frontier's RMON technology into its existing offerings.

UB: (408) 496-0111.

Plaintree Systems, Inc. has rolled out fast Ethernet interfaces for its WaveSwitch 100 **Ethernet LAN switch.** The new interfaces, which support both the 100Base-T and 100VG-AnyLAN standards, complement existing 100M bit/sec support for Fiber Distributed Data Interface and Plaintree's proprietary WaveBus technology. The new interfaces will come in the form of daughtercards that slide into one of the two optional slots offered via WaveSwitch.

The cards will be available by year end for $2,995 each.

Plaintree: (800) 370-2724.

FTP Software, Inc. has announced it is extending its training and educational services worldwide through its new Authorized Center for Education (ACE) Program, which will offer courses on how to install, configure and support **TCP/IP-based networks** using FTP's product suite. The ACE Program is available through FTP's international channel partners and resellers.

FTP: (508) 685-3300.

Vendors offer border devices for LAN switching and ATM support

BY DAVID AXNER

A handful of vendors have introduced next-generation LAN hubs that offfer integrated LAN switching technology and a migration path to Asynchronous Transfer Mode.

Users can install these products to enhance the performance of existing LANs and then, when the need dictates, create ATM backbones to which they can attach servers, workstations and host computers, eliminating this traffic from their LANs.

Most of the products support Ethernet switching since Ethernet represents the largest installed base. However, three of these vendors, Centillion, NetEdge and Xylan Corp., support token-ring and Fiber Distributed Data Interface in addition to Ethernet.

Although the products are similar in that they all provide LAN switching and ATM support, each has its own unique design, support and network applications.

AGILE NETWORKS

Agile Networks, Inc. of Concord, Mass., formed in November 1991 as MultiMedia Networks, Inc., unveiled its initial product, the ATMizer 125 Relational Switch, this August.

The ATMizer, which connects legacy Ethernet LANs to an ATM backbone, combines a 12-port Ethernet switch and a six-port ATM switch, eliminating the need for a separate ATM switch.

The LAN switch contains a Segmentation and Reassembly chip that converts an Ethernet frame to ATM cells, which are then passed to the ATM switch via an internal port (one of the six switch ports). Ethernet-to-Ethernet frames are not converted.

The ATMizer supports existing LANs, including hubs, end stations and routers. And it automatically learns the network

See **Hubs**, *page L4*

LAN/ATM switch characteristics

Vendor	Product	LAN switching	ATM support	Availability	Pricing
Agile Networks	ATMizer 125	Ethernet: 12 switched ports	ATM switch: as many as 5 OC-3 (155M bit/sec) ATM ports	4Q 1994	$36,000 (includes 2 ATM ports); ATM port module: $2,500
Centillion Networks	SpeedSwitch 100	Token ring: as many as 24 switched ports; FDDI: as many as 6 DAS ports	3.2G bit/sec ATM switch: scalable to 24 OC-3 ATM ports	Now	$9,995 (includes 4 token-ring ports)
NetEdge Systems	NES 8000 Edge Router	Ethernet: 20 dedicated plus 32 shared ports; token ring: 16 ports; FDDI: 4 ports	1 to 4 ATM OC-3/DS3 interfaces with internal DSU/CSU	Shipments began in January 1994	$12,000-$14,000 for basic unit plus $11,000 for token ring; $6,000 to $8,000 for FDDI; $10,000 to $11,000 for ATM
NiceCom	NiCell 200	Ethernet: 12 switched ports	ATM switch: 1 OC-33/DS3 port	January 1995	$8,400 ($700 per port)
	NiCell 1200	Ethernet: 48 switched ports	ATM switch: 4 OC-3/DS3 ports	January 1995	$48,000 ($1,000 per port)
	NiCell 2000	None	ATM switch: 16 OC-3 ports	January 1995	$39,600 ($2,475 per port)
ONET	LANBooster 2000	Stackable hub Ethernet: 12 switched ports	Stand-alone solution planned for mid-1995	September	Less than $12,000 (less than $1,000 per port)
	LANBooster 5000	Modular hub Ethernet: scalable from 12 to 48 switched ports	ATM backplane; ATM support planned for 3Q 1995	4Q 1994	$7,000 for base unit plus $9,000 per module
Xylan	OmniSwitch Modular Hub	Ethernet: 32 or 64 ports; token ring: 24 or 48 ports; FDDI: 4 or 8 DAS ports and 16 or 32 SAS ports	1/2-port OC-3 link to external ATM switch: as many as 8 or 16 OC-3 ports	By 1Q 1995	Pricing varies according to configuration: $3,500 (5-slot) or $5,950 (9-slot) for chassis plus modules; $4,950 for Ethernet; $8,850 for token ring; $8,250 per FDDI DAS; $8,000 per ATM port

GRAPHIC BY SUSAN J. CHAMPENY — SOURCE: DAX ASSOCIATES, ORELAND PA

Defusing TCP/IP-based internet problems in layers

Determining where the trouble resides is first step.

BY MARK A. MILLER

As TCP/IP-based internetworks grow in number and in size, so do TCP/IP-related network problems. The astute net manager has to stay one step ahead of trouble to keep customers happy.

Because TCP/IP is a layered architecture like Open Systems Interconnection, the key challenge for the network troubleshooter is to determine which layer is the most likely culprit.

Consider some of these layer-by-layer problems and likely causes.

NETWORK INTERFACE LAYER

Network interface layer problems for TCP/IP-based internets are rooted in the typical causes of LAN and WAN problems, such as Ethernet collisions, beaconing token rings or noisy WAN links.

Since TCP/IP, more than any other architecture, has been adapted to run over virtually any type of net — including WANs — the key to troubleshooting TCP/IP-based internets is in the analyst's preparedness to test a variety of network links and protocols.

It is quite possible, for example, for a TCP/IP connection to start on an Ethernet, traverse a frame relay WAN and terminate on a token-ring LAN.

Unfortunately, these types of problems simply require the network staff to test networking hardware at every step along the way.

INTERNET LAYER

One of the principal functions of the internet layer is routing — the process of getting a data packet from one host to another host via the internetwork. As a result, if an analysis of the network traffic verifies that a packet left the source LAN but never reached the destination LAN, a routing-related problem would be suggested.

One of the easiest troubleshooting tools, which comes as a required part of all IP implementations, is the Internet Control Message Protocol (ICMP). This protocol is equipped with a number of predefined messages that test intranetwork connectivity functions.

The most commonly used message is the ICMP Echo, known on most Unix systems as the PING command. To test the internetwork communication path between one host and another, a user at one end issues an ICMP Echo command, and the remote host returns an ICMP Echo Reply.

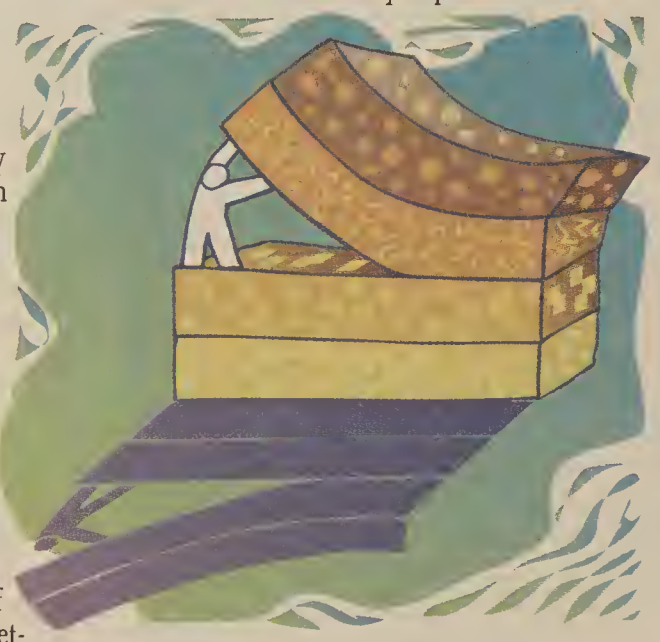
Should an end-to-end test fail, try to PING successive intermediate locations until the defective link is isolated. Many enterprise network management consoles use the ICMP Echo commands to poll internet devices, such as bridges or routers, for a periodic health check.

Addressing and address conversions also play a big role in the internet layer processes. An IP address is 32 bits in length, and like the 48-bit LAN address, must be unique to each workstation or host. In many cases, this IP address is specified in a workstation configuration file, and a mistaken duplication of this address by another workstation or host will cause confusion on the internetwork.

Translation between hardware (for example, network interface layer) addresses in LAN and WAN hardware and the IP address resident in the software is also needed.

The Address Resolution Protocol (ARP) and the Reverse ARP handle these translations. If the analyzer reveals repetitive requests to translate the same address, these processes should be examined to find if the results are not being cached or a translation to an unreachable net is being requested.

Other internet layer problems include



broadcast storms, or numerous broadcast messages that jam the network; ICMP redirect messages, indicating a misrouted packet; and a low IP Time-to-Live field, indicating a packet that is about to "die" for lack of proper delivery.

HOST-TO-HOST

The host-to-host layer operates exclusively in the hosts, not in the intermediate routers, and is responsible for reliable communication between originating and terminating host processes.

Functions of this layer include establishing and terminating the end-to-end connection; identifying the process for which this message is intended using a port address; assuring the sequentiality of the message; and verifying the accuracy of the transmission using a checksum.

Let us suppose that end-to-end communication of the application data fails, yet a check of the internet connectivity, using an ICMP message, is successful. The host-to-host layer is a possible culprit, so the next step is to use a protocol analyzer to check for proper connection establishment, correct port addressing and sufficient receiver buffer size allocation. An analysis of this layer could also reveal intermittent operation of the lower two layers.

For example, if TCP retransmitted the same data sequence numerous times, possible causes could be a noisy WAN link or defective LAN hardware causing excessive collisions.

If a TCP Reset Connection is identified, an abnormal closure of the connection has occurred. Client/server interactions are often the cause of a Reset, such as an unresponsive server that causes the client workstation to issue the Reset after numerous failed attempts.

PROCESS/APPLICATION LAYER

The process/application layer sits at the top of the ARPA architecture and interacts with the end-user processes via the host operating system. Parameter incompatibilities, such as attempting a file transfer in ASCII mode when binary mode is required, are common.

Another possible cause could be differences in implementation of two different E-mail or network management products, both of which adhere to the respective standards but, together, do not interoperate.

For example, a network management console and network management agent residing in a router could both implement SNMP and the related elements of the Internet Network Management Framework, such as the standard Management Information Base (MIB).

If the router vendor chooses not to implement one of the managed objects within the MIB, and the management console requested the value of that object, an error would result. Both console and router would claim compatibility with SNMP; however, the degree of that compatibility, as evidenced by their interoperability, would be vastly different.

Once again, the protocol analyzer is the troubleshooter's most effective tool to identify these interoperability deficiencies.

EXPERT ASSISTANCE

TCP/IP-based internetworks, which typically handle thousands or tens of thousands of packets every second, can be a real challenge to troubleshoot, especially if the problem is intermittent.

Sifting through thousands of captured packets and correlating that information into a meaningful diagnosis can be time-consuming. Fortunately, several network analyzers, including Hewlett-Packard Co.'s Network Advisor and Network General Corp.'s Expert Sniffer build expert capabilities into their products.

One of the key advantages of the expert system is that it looks for predefined error events and alerts the network manager of their occurrence. For example, excessive retransmissions of the same message will be indicated in a specific window, advising the manager of possible causes and a corrective action to pursue.

Some indication of the severity of the symptom is also noted, giving the manager an indication warning's urgency. A duplicate IP address, for instance, may cause difficulties for a few users, while an abnormally small TCP window size or excessive application retransmissions could indicate a server or transmission link failure, affecting many users on the network.

As TCP/IP becomes more popular, the key to things running smoothly is to become familiar with both the tools and the technology before — not after — a failure occurs.

Miller is a contributing editor to *Network World* and president of DigiNet Corp., a Denver-based data communication engineering firm.

The ARPA model

TCP/IP-based internetworks are best analyzed with a copy of the Advanced Research Projects Agency (ARPA) architecture close at hand, showing what layer does what.

The first layer of the ARPA model is the network interface layer, sometimes called the network access layer or local network layer.

This layer addresses the manner in which the local host is connected to the LAN or WAN hardware. As such, it comprises the functions of the Open Systems Interconnection physical and data link layers: the connection to the cable; accessing the cable at the appropriate time; and placing the data within a structure called a frame, which contains a local address for both sender and receiver.

Ethernet, FDDI and token-ring LANs operate at the network interface layer, as do leased lines, frame relay and Switched Multimegabit Data Service WANs.

The internet layer, which corresponds to the OSI network layer, transfers packets — containing an additional layer of addressing, the network address — from one host to another host via the internetwork.

The key protocol that operates at the internet layer is the Internet Protocol, or IP.

As packets traverse the internetwork, the possibility exists that they may get lost or damaged. The host-to-host layer, analogous to the OSI transport layer, assures a reliable end-to-end transmission path. This layer may be implemented with two protocols, the User Datagram Protocol (UDP) or Transmission Control Protocol (TCP).

UDP has less overhead and a corresponding lower reliability, while TCP is ultrareliable but at a cost of high overhead.

For example, let's assume that a single character, such as a telnet response of a Y for Yes was transmitted over an Ethernet LAN using TCP/IP. The Ethernet frame would have a length of 64 octets (bytes, for the nontechies), of which 18 octets would be Ethernet frame overhead, 20 octets would be IP overhead, 20 octets would be TCP overhead and six octets would be the TELNET character (one octet plus five more for padding).

How TCP/IP layers stack up

OSI model	ARPA model
Application	Process/application
Presentation	
Session	
Transport	Host-to-host
Network	Internet
Data link	Network interface
Physical	

SOURCE: DISINET CORP., BROOMFIELD, COLO.

But TCP/IP would guarantee the delivery of this character, retransmitting as necessary until the job was complete.

End users interact with the upper ARPA layer, the process/application layer, which encompasses the OSI session, presentation and application Layers.

A number of application-specific protocols have been developed for this layer, including the File Transfer Protocol, telnet, the Simple Mail Transfer Protocol and the Simple Network Management Protocol.

LMS GOES MOBILE.

Wright Line's Mobile LAN Management Systems (LMS) are easy to set up, easy to relocate into tight spaces and easy to access from behind. The base acts as a tower

shelf that can hold up to 750 lbs. The Mobile LMS comes in seven widths, from 24" to 72". Contact Wright Line for details.

NEW LMS SWITCH™.

Controls your entire system (up to 8 CPUs, expandable to 64) with a single monitor, keyboard and mouse. This eliminates the need for multiple monitors and reduces the amount of space required for housing hardware. The microprocessor controlled LMS SWITCH automatically emulates virtually any PC-based keyboard and mouse – another smart solution from Wright Line.

HOW TO CLEAN UP THE ENVIRONMENT.

NEW LAN LOCKER™.

Provides secure locking storage for network hardware in a totally modular, enclosed unit. Stores monitors, keyboards, servers/towers, rack-mountable hardware and assorted peripherals in 30", 60", or 90" wide models. Features tinted Plexiglas® doors, plus optional fully ventilated fixed and rollout shelves, and keyboard platforms with extendible mouse tray.

Introducing LMS,™ technical furniture solutions for LAN environments.

Wright Line's LAN Management System* (LMS) organizes equipment in 50% to 70% less space while cleaning up clutter and improving the appearance and efficiency of your LAN environment.

Better Flexibility

LMS employs an open architecture of over 500 interchangeable components. You can start off small and easily reconfigure to grow your system in height and width to meet the changing needs and additions to your LAN.

Better Built

LMS features an innovative cable management system that doesn't just hide cables. Instead, it organizes them allowing easy accessibility. LMS's heavy gauge steel construction eliminates swaying and sagging. LMS standard stationary configurations hold a minimum of 2250 lbs. of equipment. Surfaces and shelves are ANSI/BIFMA rated with 300 to 1000 lbs. capacities.

Better Warranty

Best of all, LMS is backed by Wright Line; and we stand behind the quality of all our furniture with a 10-year limited warranty.

Better Fax or Call Wright Line for a FREE LMS Catalog and Ordering Guide.

Fax: 508 853-8904 Tel: 800 225-7348

I have a need in ☐ 30 ☐ 60 ☐ 90 days.

Name/Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

NETWW 94

W R I G H T · L I N E

technical furniture solutions

* Patents Pending

OPTIMEDIA® CABINETS FOR LANs.

Optimedia Cabinets from Wright Line bring multi-purpose, multi-use, multi-media storage to LAN environments. They are perfect for the secure storage of CDs, 4mm and 8mm tapes, diskettes and other magnetic media, as well as software documentation and manuals. Choose from eight heights, vertical and horizontal tambour doors and more than 40 interchangeable interior components.

Hubs

Continued from page L1

topology, including subnetwork structure and server locations. It supports the prominent network-layer protocols. Either 10Base-T or 10Base-FL connections can be established to LAN end stations and wiring hubs.

Customers can use the ATM ports to support workstations or servers at 155M bit/sec or to link the switch to other ATM switches in a backbone. As more bandwidth is needed, users can scale up the ATM backbone by adding more ATMizers.

Agile does not provide for WAN links; however, a remote ATM router can be attached to a port on the ATM switch to support a WAN link.

A key component of the ATMizer is the ATMman Relational Network Manager. Besides the ability to perform the essential management functions, this software supports the virtual LAN concept.

It lets users configure their LANs in partitions, each related to a specific group of users, based on protocol type and subnetwork address. Users within each relational group are part of the same logical group, regardless of their physical location in the net. For example, these users could be scattered across a campus or on different floors of a high-rise building.

The virtual LAN software eliminates reconfiguration for moves, adds and changes, and makes it easy to reassign users to different logical groups. ATMman runs on a Sun SPARCstation as an SNMP Version 2 management application and lists for $2,500.

The ATM backbone topology is monitored to maintain connectivity in the event the topology is changed by an integral ATM Connection Manager, which also services ATM User-to-Network Interface requests for the creation of ATM virtual channel connection. In the event of a link failure, the ATMizer reestablishes virtual connections via an alternate path.

NICECOM

NiceCom, Inc. of Lexington, Mass., now owned by 3com Corp., introduced its initial family of Ethernet/ATM switches this August. Its products, although similar in conception to Agile's, differ in design and functionality.

NiceCom's NiCell switches do not switch LAN frames; instead, they convert all Ethernet frames (including Ethernet-to-Ethernet frames) to cells via NiceCom's application-specific integrated circuit (ASIC) called the ZipChip1.

The cells are switched at 780,000 cell/sec (2.56 microsecs per two cells) and either passed to the ATM port for transport over an ATM backbone or reconverted to frames and sent to Ethernet ports.

NiceCom's switching strategy eliminates the need for two kinds of switches and handles all information in the same format. NiCell supports switched virtual circuits (SVC) to provide the flexibility of switching circuits between all endpoints.

NiceCom's switching strategy eliminates the need for two kinds of switches and handles all information in the same format.

NiceCom's NiCell 200 Workgroup Switch is a fixed-configuration, stackable switch that has 12 switched Ethernet ports and one ATM port. Its Departmental Switch, the NiCell 1200, is a modular unit that can scale up to 48 Ethernet ports in 12-port increments and provides up to four ATM ports to accommodate network growth.

NiceCom also provides a 16-port ATM backbone switch, the NiCell 2000, to interconnect the ATM ports on its workgroup and departmental switches in a campus ATM backbone. Workgroup or departmental switches can be linked to a local NiCell 2000 via an OC-3 (155M bit/sec) fiber link or to wide-area ATM network via a DS3 link.

Fault tolerance is a key factor of these products. They are available with dual power supplies, fans, processors, switching fabric and hot-swappable modules.

Users can manage the NiCell products from management workstations using Simple Network Management Protocol or NiceCom's management application, which runs on HP OpenView. Virtual LANs are supported by the management application, enabling network managers to set up logical workgroups, which eliminates the need to rewire hubs to accommodate moves, adds and changes.

ONET

ONET Data Communications Technologies, a Carmiel, Israel, firm founded in January 1993 with a U.S. office in Cambridge, Mass., offers a product family similar to NiceCom's NiCell family.

Like NiceCom, ONET addresses the Ethernet switching market with two products: the LANBooster 2000, a stackable, fixed-configuration, 12-port 10Base-T Ethernet switch; and the LANBooster 5000, a modular, four-slot chassis that supports 12-port Ethernet switching modules for a scalable capacity of 48 10Base-T ports.

See **Hubs**, *page L6*

Clip and Save

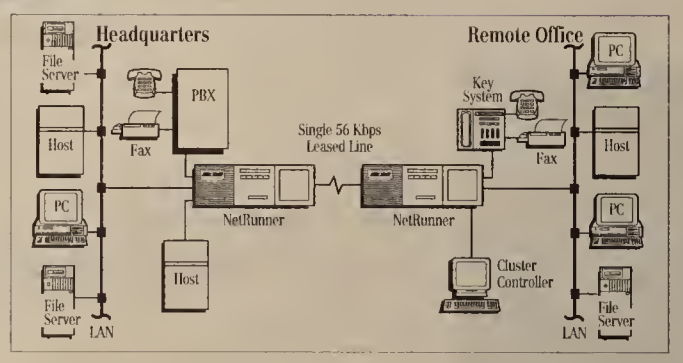
SAVE 100% ON YOUR NEXT REMOTE BRIDGE

From now on, buying an ordinary bridge for remote communications is just plain wasteful.

NetRunner™ is more than a remote LAN bridge. It actually pays for itself in savings. Cell Relay-based Fast Packet technology combines voice, fax and data with your LAN/WAN traffic—without sacrificing LAN/WAN performance.

The result? Free interoffice phone calls and fax! That saves you thousands of dollars each year in toll charges.

Once NetRunner saves enough to pay for itself, the savings go to your bottom line.



See how much NetRunner can save you. Call for a free brochure: (800) MICOM AD [642-6623] or dial our 24-hour fax (805) 583-1997.

Call today and stop wasting money.

MANUFACTURER'S COUPON EXPIRES 12/31/96

NetRunner. It pays for itself.

MICOM®

MICOM Communications Corp., 4100 Los Angeles Ave., Simi Valley, CA 93063-3397 Phone: (805) 583-8600 Fax: (805) 583-1997

COUPON NOT TRANSFERABLE. OFFER VOID WHERE PROHIBITED BY LAW. ACTUAL CASH VALUE 1/20 OF ONE CENT. TRADEMARKS ARE PROPERTY OF THEIR RESPECTIVE OWNERS.

Circle Reader Service #6

Fiber to the desk? I'd like to know more.

❑ I need to know right away. Please have an AMP representative contact me.

❑ Please send me your brochure.

Name _____

Company _____

Address _____

City _____ State _____ ZIP _____

Phone _____ FAX _____

NW

AMP is a trademark.

AMP

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

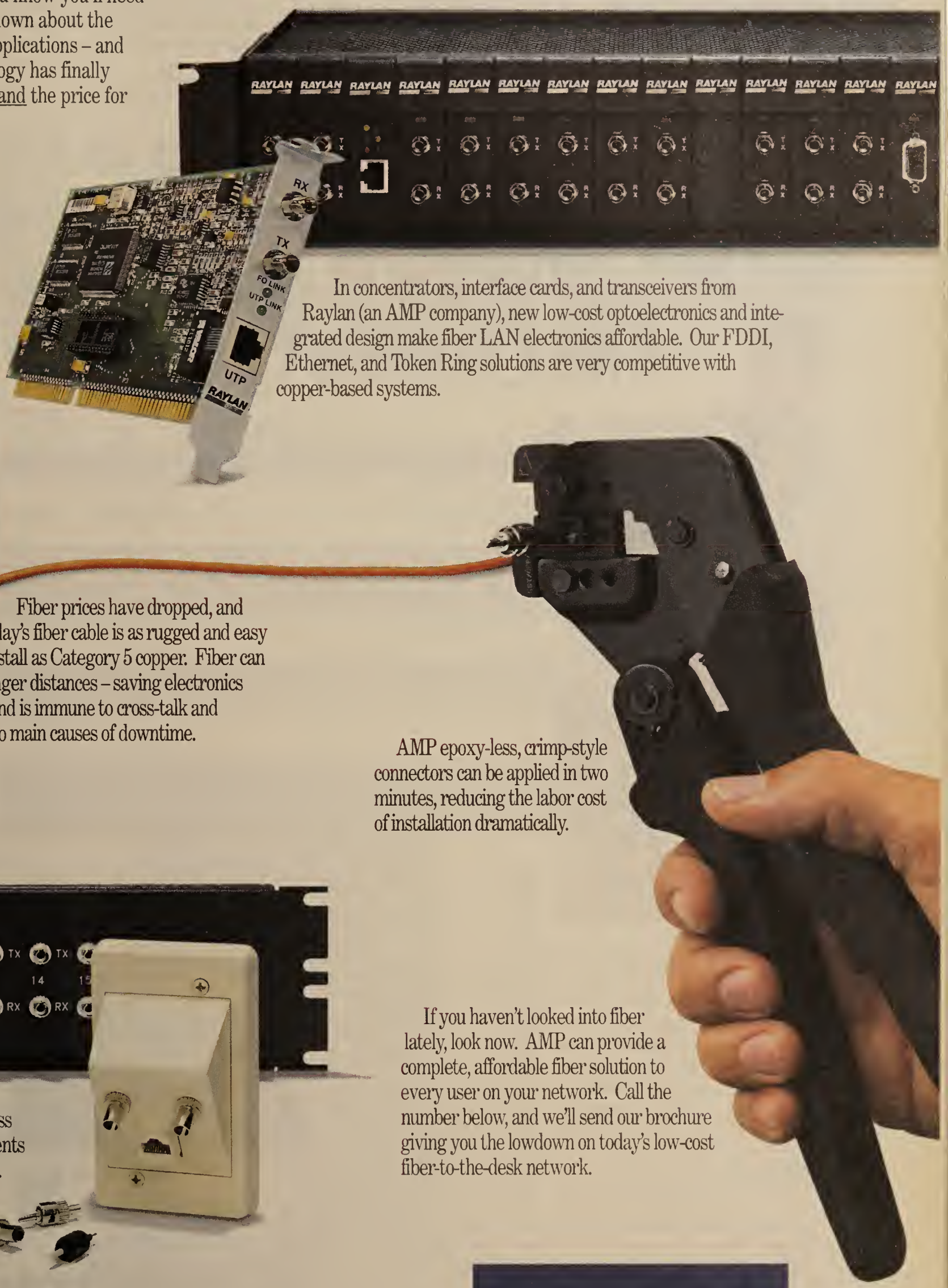
FIRST CLASS MAIL PERMIT NO. 7055 HARRISBURG, PA

POSTAGE WILL BE PAID BY ADDRESSEE

RESPONSE SERVICE 084-023/8125
AMP INCORPORATED
PO BOX 3608
HARRISBURG, PA 17105-9964

Fiber to the desk.
Finally the time and the price are right.

Your network is growing fast; you know you'll need more bandwidth soon. You've known about the superiority of fiber in network applications – and the price drawback. But technology has finally changed the equation. The time and the price for fiber are right, right now.



In concentrators, interface cards, and transceivers from Raylan (an AMP company), new low-cost optoelectronics and integrated design make fiber LAN electronics affordable. Our FDDI, Ethernet, and Token Ring solutions are very competitive with copper-based systems.

Fiber prices have dropped, and today's fiber cable is as rugged and easy to install as Category 5 copper. Fiber can run longer distances – saving electronics costs – and is immune to cross-talk and EMI/RFI, two main causes of downtime.

AMP epoxy-less, crimp-style connectors can be applied in two minutes, reducing the labor cost of installation dramatically.

Continued development and mass production of fiber-related components have driven their cost down as well.

If you haven't looked into fiber lately, look now. AMP can provide a complete, affordable fiber solution to every user on your network. Call the number below, and we'll send our brochure giving you the lowdown on today's low-cost fiber-to-the-desk network.

For more information, call our Fiber to the Desk Information Center at 1-800-835-7240 (fax 910-727-5858). AMP, Harrisburg, PA 17105-3608. In Canada, call 905-470-4425.

AMP is a member of the TIA Fiber Optic Division LAN Section. AMP is a trademark.

AMP

Circle Reader Service #1

Hubs

Continued from page L4

ONET positions the product as a hub of hubs in collapsed backbone configurations.

Both ONET products provide a dedicated 10M bit/sec of bandwidth to each port. Their switching architecture is based on shared memory and a high-speed backplane bus.

The LANBooster 5000 converts LAN frames to cells, which are passed over the backplane to the destination Ethernet module where cells are reconverted to frames.

Both switches forward frames as soon as the destination address is received (called cut-through frame forwarding), which substantially improves switching speed and minimizes latency — a fixed delay of 35 microsecs for either product. It does, however, mean bad packets will be propagated across the net since no checksum is performed.

This fixed delay is maintained when traffic load becomes heavy by temporarily interrupting forwarding until an overload condition is relieved, eliminating frame loss. Also, each port supports the full complement of 1024 MAC addresses.

Neither of these products currently support an ATM backbone. ATM support for the LANBooster 2000 is planned for mid-1995. Because the LANBooster 5000 has a cell bus backplane, it is essentially ATM-ready. ATM support for the LANBooster 5000 is planned for third-quarter 1995.

Both products support SNMP Management Information Base II as an SNMP agent. They also support IEEE 802.1d, the Spanning Tree bridging standard.

CENTILLION

Centillion Networks, Inc. of Mountain View, Calif., formed in September 1993, targets users' token-ring and FDDI installed base.

Its SpeedSwitch 100 is designed to enable users to optimize token-ring networks via token-ring switching, connect existing token rings to existing FDDI backbones and provide ATM backbone support. That makes the SpeedSwitch 100 a flexible product that can be used for a number of applications that replace bridges and routers.

The switch has a 3.2G bit/sec ATM switching fabric that is used to connect plug-in switching modules for token-ring, FDDI and ATM. Switching is distributed among the modules, each of which has 1.2G bit/sec of switching capacity, meaning the box has an aggregate capacity of 10G bit/sec. A separate backplane bus supports network management for each of the modules.

The six slots in the box can be populated with any combination of token-ring, FDDI or ATM modules.

A TokenSpeed token-ring module provides four 4M/16M bit/sec switched ports with Auto Sensing, letting users configure up to 24 4M/16M bit/sec token-ring ports. Users can chose among UTP (RJ45), STP (DB9) or multimode fiber (ST) port connections. Each of the ports can be used as dedicated ports for power users or as shared ports for normal business users.

The FDDISpeed FDDI module contains one Dual Attached Station (DAS) FDDI interface, enabling users to configure the SpeedSwitch 100 to connect Token-Ring networks to FDDI backbones. Token-ring or FDDI frames passed between ports on different modules are first converted to ATM cells, passed over the ATM switch then reconverted to token-ring or FDDI frames. LAN frames are passed in native mode between ports on the same switching module.

The ATMSpeed/155 module supports OC-3 multimode fiber only and is available in two- or four-port versions using MIC connectors. This module can be used to interconnect a backbone network of SpeedSwitch 100s or to provide up to 24 ports for a SpeedSwitch configured as an ATM switch.

Centillion's network management application, SpeedView, supports both an SNMP agent and an IBM LAN management agent. It is available for HP OpenView for Unix, IBM NetView/6000 and SunConnect SunNet Manager for $4,500, or Microsoft Windows for $795. The management application lets users group ports into virtual rings to create logical workgroups, but an extend router is required to move traffic between those virtual LANs.

NETEDGE

Branch offices that are looking for a network edge router with provision for a migration path to ATM should evaluate NetEdge Systems' NES 8000 Edge Router.

NetEdge, spun off from FiberCom, Inc. in January, positions the NES 8000 as a machine capable of linking existing LANs and providing a migration path to ATM backbones.

As such, it serves several applications. As a hub of hubs in an Ethernet environment, for example, the NES 8000 functions as an Ethernet switch that can provide dedicated or shared ports for up to 20 Ethernets. Ethernet ports can be AUI, 10Base-T or 10Base-FL for campus connectivity.

NetEdge provides a 12-port 10Base-T Ethernet module, but its 12 RJ-45 ports are actually four 10M bit/sec ports fanned out to 12 ports, meaning groups of three ports share the 10M bit/sec bandwidth. With four of these modules installed, the router supports as many

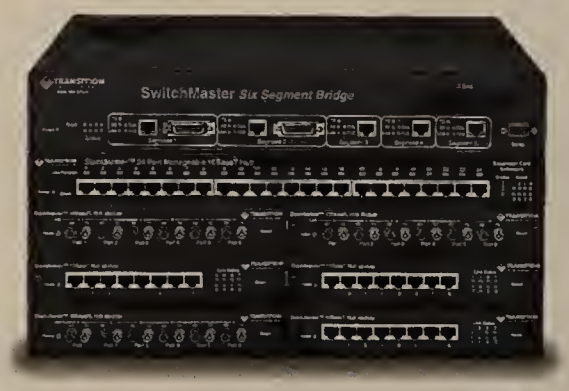
Given How The Competition Stacks Up, The Choice Is Clear.

	Modular Repeaters	Hot Swap Repeaters	10BaseFL Repeaters	Modular Uplinks	Bridge Module	Mgmt. Engine	List price per managed port (at 48 ports)
TRANSITION StackMaster System	**YES**	**YES**	**YES**	**YES**	**YES**	**Ext/Int**	**$ 62.35**
HP AdvanceStack	NO	NO	NO	YES	YES	Int	$ 74.88
3COM LinkBuilder FMS II Superstack	NO	NO	YES	YES	YES	Int	$ 79.10
ASANTE NetStacker	YES	YES	YES	NO	YES	Int	$ 84.33
NETWORTH 2000 SNAPS	NO	NO	NO	YES	NO	Int	$ 77.81
CHIPCOM ONsemble	NO	NO	NO	NO	NO	Ext/Int	$ 107.92
SYNOPTICS LattisHub	NO	NO	NO	NO	NO	Int	$ 83.02

Even with all the options in stackable hubs, there's really only one choice, the StackMaster™ Hub from Transition Engineering. Check and compare the features you want most in a stackable — scalability, expandability, flexibility, SNMP management and affordability. Side by side, you'll find that the StackMaster offers all the features you need at a better price per port. The StackMaster features a RISC processor, flash memory, wire-speed bridging, hot swappable modules, uplinks to all media types, redundant links, single or multiple collision domains, Netmaster™ network management software and much more.

So if you wondered which Ethernet hub comes out on top of the stack, check the options carefully and you'll find there's really only one choice — the ATM-ready, StackMaster hub. For more information on how the StackMaster can solve your hub problems today while preparing your network for the future, call us at **1-800-268-5124**.

The competitive information contained in this ad is believed to be accurate and is based on documentation published by the respective companies as of August, 1994. Developer tested only. Novell makes no warranty with respect to this product. Details on lifetime warranty available on request. Stackmaster and Netmaster are trademarks of Transition Engineering Incorporated. All others are the property of their respective companies.



Limited lifetime warranty.
Made in the U.S.A.

yes It runs with NetWare

TRANSITION ENGINEERING, INC.

7090 Shady Oak Road
Eden Prairie, MN 55344 USA
(612) 941-7600 • fax (612) 941-2322

Circle Reader Service #8

as 52 Ethernets, but only 20 ports are dedicated 10M bit/sec ports.

The other Ethernet modules contain four ports. The router supports major protocols and bridging standards.

With a software release scheduled for availability by the end of the year, the NES 8000 will also be able to function as a token-ring switching hub, supporting as many as 16 token rings via four four-port modules.

Applications that require 100M bit/sec backbones for high-performance servers and workstations can use the NES 8000 as an FDDI concentrator. It can support as many as four single-port DAS modules or as many as three dual-port single attachment station (SAS) modules. One DAS module is required to connect to the dual rings.

Users can also configure the NES 8000 to support a mix of applications. The basic unit consists of an engine card with four AUI Ethernet ports and four high-speed serial ports for WAN links up to T-1 speeds. It also provides four slots for Ethernet, token-ring, FDDI and ATM modules. These modules can be mixed and matched according to user needs.

The NES 8000 will also be able to function as a token-ring switching hub, supporting as many as 16 token rings via four four-port modules.

Migration to ATM is easy. The router supports an ATM module with integral data service unit/channel service unit, which is available with a DS3 BNC port or an OC-3c ST port for fiber.

A Transparent Asynchronous Transmitter/Receiver Interface for direct connection of ATM workstations over a fiber link is expected for first-quarter 1995. The module uses a TranSwitch chipset and supports ATM Adaptation Layers (AAL) 3/4 and 5; however, the ATM module supports AAL 5 only, permanent virtual circuits (PVC) and IP routing over ATM.

The ATM software lists for $1,500. The user can chose to install two ATM cards for connection to two ATM switches in an ATM backbone network for redundancy. NetEdge supports the Fore Systems, Inc. Simple Protocol for ATM Network Signaling software — which costs $1,000 — for call signaling and SVCs.

XYLAN

Another key player in the network edge switch market is Xylan in Calabasas, Calif. Xylan also saw a need for a product that would improve the performance of existing networks, integrate LANs, support FDDI backbones and provide a migration to ATM.

Xylan's OmniSwitch not only supports Ethernet, token ring and FDDI, it also provides connectivity between each type of LAN through automatic media access control (MAC)-layer translation. This is an attractive feature for users that have different types of networks and need to integrate the networks and pass information, such as E-mail, between all end points.

All LAN connections are switched, providing concurrent paths between two or more user connections with minimal latency. The OmniSwitch also supports IP and IPX routing (including IP routing over ATM in accordance with RFC 1577), as well as all the major bridging standards. The standard IP Routing Information Protocol is employed, meaning the OmniSwitch can be used in place of a more expensive and complex router and is interoperable with any standard IP router.

OmniSwitch users can organize their network into virtual LANs. Individual workgroups can include any selection of ports encompassing different LAN topologies and multiple OmniSwitches within a network. For example, a virtual LAN can include a group of Ethernet and token-ring users on one OmniSwitch, token-ring users on a second OmniSwitch and Ethernet users on a third OmniSwitch within a network.

Users that need connectivity between selected virtual LANs can link them through internal routing or external routers. A maximum of 65,000 virtual LANs can be configured using Xylan's graphical user interface network management application, OmniVision.

User that have FDDI backbones can attach Ethernet and token ring to them via the OmniSwitch. Since the OmniSwitch supports DAS modules, users can also employ the box to interconnect FDDI backbones.

The OmniSwitch is available in either a five- or nine-port chassis — limited to four or eight slots, respectively, for plug-in modules since a management module fills one slot.

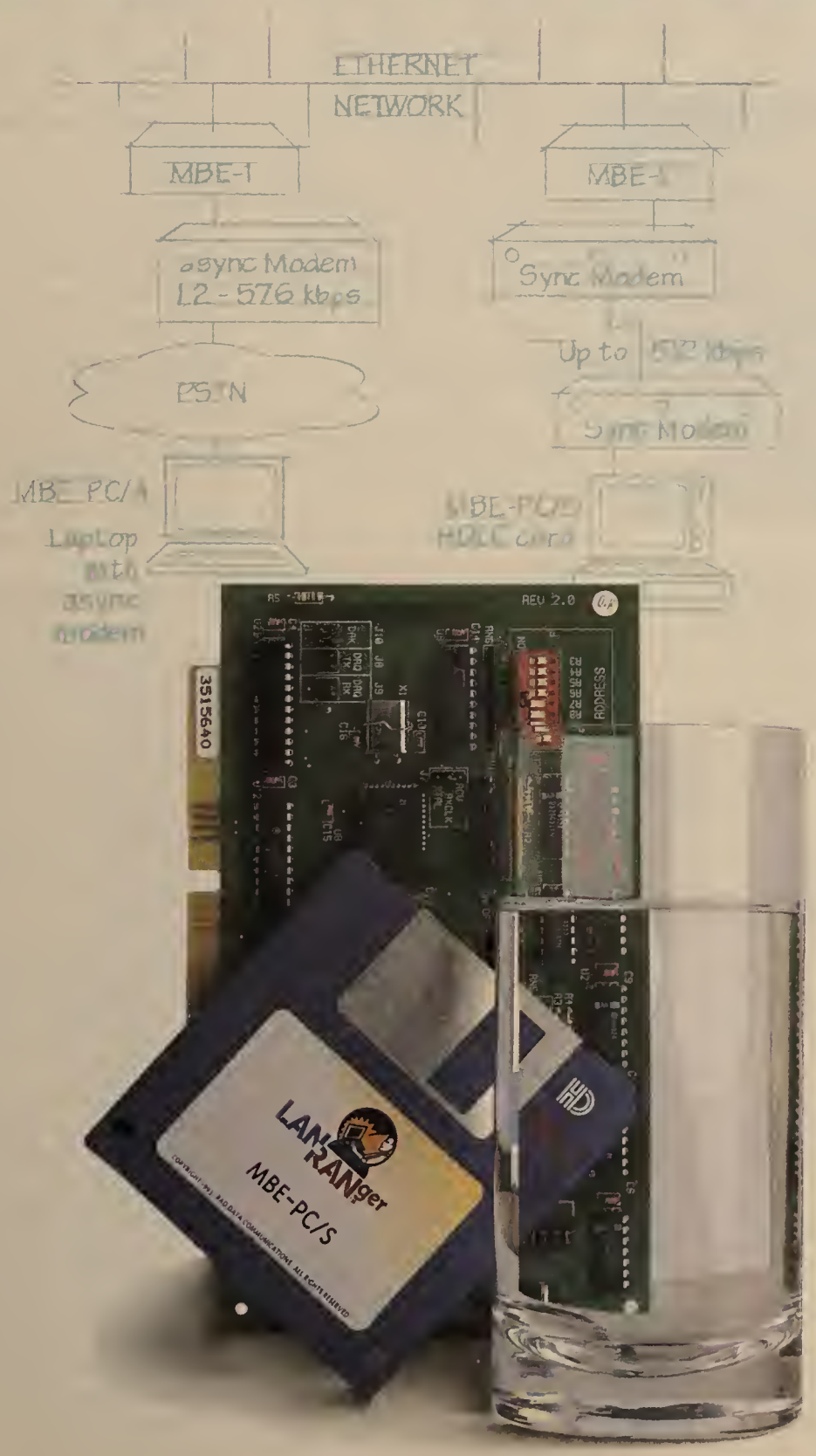
The architecture features a 640M bit/sec passive bus backplane and active plug-in switching modules for Ethernet, token ring and FDDI. All traffic passed between modules over the backplane is in native mode. Each of the switching modules support 1,024 MAC addresses per module, which are automatically learned.

The 10Base-T Ethernet switching module provides eight 10M bit/sec RJ45 ports, which can be used as shared or dedicated ports for user end stations or connected to existing Ethernet hubs in a hub-of-hubs configuration. The OmniSwitch supports 32 Ethernets in the

See **Hubs**, *page L9*

CLEARLY SIMPLE

RADICALLY TRANSPARENT



REMOTE LAN ACCESS

RAD's MBE-PC lets any remote PC or laptop access an Ethernet LAN transparently.

Telecommuters, mobile employees, LAN bosed services subscribers... RAD's MBE-PC now gives you o simple remote connectivity solution.

It's totally transparent! Employing MAC-level bridging and ODI ond NDIS pocket driver interfaces, MBE-PC works with all level 3 protocols ond with OS/2, DOS ond Windows operating systems. It supports oll popular network operating systems, such os Novell Networe, Microsoft LAN Manager, IBM LAN server, plus emulotion for SNA connectivity. This gives you unmotched flexibility.

MBE-PC comes in both synchronous ond asynchronous versions. The async version is softwore only and handles data rates up to 115.2 kbps for the V.Fost modems. The synchronous version supports up to 512 kbps. And you can use the WAN link of your choice: DDS, ISDN, PSTN, and dial-up links. You'll make the connection every time.

Yet with oll these features, the MBE-PC is simplicity itself. It works in conjunction with a remote access server (either a standolone or multiport MBE) connected to the central LAN. And it uses Remote Access Node technology to send pockets ocross the WAN link to the server at the LAN.

All this is backed by o company with o RADICALLY reliable record for quolity ond service. To find out more about RAD's complete line of remote access products for LAN-to-LAN and PC-to-LAN over Ethernet or Token Ring, coll us todoy.

RAD
data communications

RAD Data Communications, Inc.
U.S. East: 900 Corporote Drive, Mahwah, NJ 07430 Tel: 201/529-1100 **U.S. West:** 7711 Center Avenue, #350, Huntington Beach, CA 92647 Tel: 714/897-2448
International Headquarters: 8 Hanechoshet Street, Tel Aviv 69710 Isroel Tel : 972-3-6458181

Circle Reader Service #4

AppleTalk gateway protocols offer stepping-stone to the enterprise

RTMP-60, AURP give AppleTalk a chance on backbone nets.

BY BILL WOODCOCK

Apple Computer, Inc.'s Routing Table Management Protocol (RTMP) has long been criticized as one of the stumbling blocks delaying AppleTalk's acceptance as an enterprise backbone protocol.

Two AppleTalk exterior gateway protocols — AppleTalk Update-based Routing Protocol (AURP) and a modified version of RTMP called RTMP-60 — provide new features and major gains in efficiency, which should make AppleTalk more popular on large corporate backbones.

The competing protocols embody two approaches to the problems presented by AppleTalk routing on large-scale networks. AURP is feature-rich but difficult for third parties to implement and programmatically cumbersome. Some think it overkill, and nearly everyone agrees that it will be difficult to create efficient, fast-switching routing code that implements it fully.

On the other hand, RTMP-60 has just been finalized and it's already being decried for not going far enough to address the routing problems it was intended to address. It may be too little too late.

RTMP

RTMP, AppleTalk's default routing protocol that both AURP and RTMP-60 are intended to improve upon, is used to synchronize routers by exchanging information about network destinations.

While the 6-byte tuples RTMP employs to encode AppleTalk route information are positively diminutive compared to the 20-byte monsters that IP's Routing Information Protocol uses to represent routes, AppleTalk routers must broadcast their tables every 10 seconds, regardless of the impact this may have on the network. This makes them "bad neighbors" on large network backbones.

Unlike other routing protocols that either scale gracefully with increasing size or can be manually throttled back to decrease traffic, AppleTalk routers continue to spew forth RTMP packets in volume, which increases with the size of the network. Under some circumstances, particularly on networks with bridged WAN segments, this traffic may consume a sizable portion of backbone bandwidth.

The problem can be mitigated by tunneling — encapsulating AppleTalk packets within larger IP packets and forwarding them across virtual circuits between AppleTalk routers on IP backbones.

The first, and by far the most widely used, of these tunneling protocols was Cayman Systems, Inc.'s Simple Encapsulation of DDP in IP, or SEDI (DDP is the Datagram Delivery Protocol, AppleTalk's Network Layer protocol).

As tunnels became more common, they shifted the traffic problems associated with RTMP out onto the IP networks they traversed. In response, router vendors began trying to devise ways of freeing tunnels of unnecessary traffic, while simultaneously coming up with a standard they could all implement.

Looking to other protocol families and Apple's own AppleTalk Remote Access Protocol (ARAP) for examples, router vendors. decided to reduce the rate at which routing information was propagated or to eliminate all resending of duplicate information entirely, sending only updated or new information. The results were Cayman-backed Traffic-Reduced Encapsulation of DDP in IP, or TREDI, and the controversial Dr. Pepper.

AURP

Apple, however, had been much faster to react to the problem, having already released AURP, a whole new protocol specification. AURP addressed not only the proliferation of redundant routing information, but a host of other scaling issues that the Macintosh was beginning to run into on large corporate nets.

Unfortunately, this was not enough to win over most third-party router developers from pursuit of less ambitious alternatives. The AURP spec was criticized by developers for being processor-intensive, difficult to implement and, ironically, for trying to fix too many problems too soon.

Nevertheless, the existence of AURP made the insufficiencies of TREDI and Dr. Pepper all too obvious, and they were dropped by all but their respective advocates — Cayman and Shiva Corp., respectively — leaving the interoperability problem as great as ever.

THE GREAT DIVIDE

By this time, nearly all Ethernet router vendors included EtherTalk support, so running native AppleTalk over Ethernet was no longer a technical challenge on LANs. This generalized the problem of RTMP's "chattiness," no longer associated solely with tunneled AppleTalk.

At a meeting this spring of the AppleTalk Networking Forum (ANF), a coalition of AppleTalk router vendors, Cisco Systems, Inc.'s Dave Stine proposed the separation of the tunneling and routing-traffic issues entirely — an approach that struck everyone as one of those why-didn't-I-think-of-that ideas. Uncoupling the two only circumstantially related problems made the paths to solving each much more obvious.

To address the tunneling half of the problem, the already extant SEDI protocol was sufficient to act as a pipe between AppleTalk routers on IP backbones, provided traffic problems were not an issue. For future use, AppleTalk Least-common-denominator supposedly. Tunneling Protocol was proposed, based on Cisco's Generic Route Encapsulation, which is capable of tunneling arbitrary pairs of protocols within one another rather than just AppleTalk in IP.

RTMP-60

ANF members proposed to address the routing half of the problem by simply scaling back the frequency with which routing tables were propagated between AppleTalk routers from one every 10 seconds to one every 60 seconds. This proposal was formalized in the RTMP-60 protocol specification in April.

There are only a few differences between RTMP-60 and the original RTMP protocol. First, and most obvious, is the greater interval between packets, which also affects the duration of the route validity in routers' internal tables. That is, if a route gleaned from an RTMP packet is valid for 80 seconds, one gleaned from an RTMP-60 packet is valid for 480 seconds.

Second, RTMP-60 is intended for use only on transport networks — those that contain only two or more routers and no end-node devices. This allows

See **AppleTalk**, *page L16*

Windows Connectivity Forum

Internet access, PCI-based hardware issues heat up

By Joel Diamond
Technical director
WUGNET
Windows User Group Network
76702.1023@CompuServe.com

The word is out — Spry Corp.'s Internet in the Box (IBOX) is now in the channel and available at your local retailer for $99.

But before you run out and buy it unseen, participate on the Windows Connectivity Forum (WINCON) in a lively discussion among users who have tested beta versions of the product. You can access the IBOX thread in Section 10 of WINCON.

If you expect to use the new Spry offering, nicknamed IBOX, with your SLIP connection, be forewarned that the product only contains Point-to-Point Protocol (PPP) support.

Seems that Spry's justification for PPP is that it eliminates first-time user problems associated with complex SLIP connections and configuration issues.

The real gem within IBOX is Air Mosaic. Features of this graphical user interface-based component include Air News, a Usenet newsreader better than any commercial or shareware news client I've seen.

The discussion on WINCON about IBOX is turning into a fairly detailed one, with comparisons being made between IBOX and other shareware, as well as suggestions to replace some of Spry's client applets.

PCI: NEW BUS OR FUSS?

The Peripheral Component Interconnect (PCI) computer bus being developed by Intel Corp. has received lots of attention in the trade press and is seen as a potentially important hardware platform for Windows NT. Intel claims that the bus configuration has advantages over other bus schemes with its Plug and Play feature, faster burst rates and other capabilities.

But users need to give PCI a reality check because the bus configuration has some problems — especially troublesome with an active 32-bit server operating system.

Currently, users might employ several Small Computer System Interface cards with drives placed on one card and other devices such as CD-ROMs and digital audio tape drives placed on another card. An experienced net manager can optimize performance on an EISA-based server with this configuration.

But with a PCI-based server, little performance optimization is possible. And PCI's Plug and Play support carries a lot of overhead.

PCI manufacturers report other problems, as well. With one card in place, communications ports no longer work. With a second card in place, the system locks up. The hardware and the implementation seem not to match.

For more information on PCI issues, contact Bob Chronister, a technical associate on WINCON and president of Chronister Consultants, a Windows NT hardware consultancy in Semmes, Ala. Chronister can be reached by telephone at (205) 342-2766 or on WINCON at 70363,246.

SOLITAIRE CONFINEMENT

Next time you get a chance, ask your fellow LAN administration peers if they are aware of how many of their users are wasting time playing with Solitaire during business hours.

I've learned that many companies actually delete the SOL.EXE file from their servers, preventing users from playing. But that will not stop your users who are addicted to Solitaire — all it takes is a quick passing around of a disk containing SOL.EXE.

Recently, I came across an interesting freeware file called Solitrac, written by Hank Clyatt, designed to track solitaire usage for users on our Novell, Inc. LAN.

Initially, this program was designed exclusively to track Solitaire usage, but the latest version, SOLITR.ZIP., has been greatly expanded.

Now available in WINCON Library 7, Solitrac can track any user-defined program launched from a network server for the length of time it has been running.

A report manager is also included that allows network administrators to view and run reports from the archive database.

I don't know if Solitrac will replace the need for software metering on NetWare servers, but it's worth looking into — because it's free!

CompuServe

To get to Windows Connectivity Forum, type Go Wincon at any ! prompt on CompuServe. If you are not currently a member of CompuServe, *Network World* and the Windows users group network are offering a free membership signup by calling (800) 524-3388. Ask for operator 426.

FREE Information

on the latest products and services advertised in *Network World's* LAN WORLD section.

- Please answer questions 1 to 4 and complete the name and address information below.
- Circle the numbers beside each of the companies from whom you would like to receive free literature.
- Then, simply fold, tape the bottom edge closed, and drop it in the mail for your free literature.

1. Action requested

1 ❑ Request for sales call
2 ❑ Request for proposal
3 ❑ Request for information

2. Purchase timeframe

4 ❑ Within 60 days
5 ❑ Within six months
6 ❑ Within one year

3. Scope of purchase responsibility

7 ❑ Enterprise wide
8 ❑ Departmental

4. Purchase influence/ number of sites

9 ❑ one site
10 ❑ 2-9 sites
11 ❑ 10-20 sites
12 ❑ 21+ sites

10/17/94

Name _____

Title _____

Company _____

Street _____

City _____ State _____ Zip _____

Phone _____ Fax _____

1 **AMP**

Multi-media network solutions include connectors, active/passive devices, patch panels, cables and accessories from AMP.

2 **OSITECH** Communications Inc

"Ositech is the premier developer of multi-function PCMCIA technology. A wide range of products combining Modem, Network, Sound, SCSI and Cellular functions are available."

3 **NETMANAGE™**

Chameleon 4.0 • 24 Windows Applications • More Than Any Other TCP/IP Package

4 **RAD**

RAD Data Communications designs and manufactures an extensive line of high quality products in both wide-area networks (WAN) and local-area networks (LAN),offering over 200 different products.

5 **ADC Kentrox**

Make technology practical. Call ADC Kentrox for T1/FT1, E1, T3/E3, SMDS, Frame Relay and ATM network access solutions.

6 **MICOM** *Products That Pay for Themselves™*

Micom is the worldwide leader in low cost integrated networking products. 1-800-MICOM-AD

7 **SANYO ICON**

Ultra high performance RAID storage from the leader in Intelligent Disk Subsystems for enterprise networks.

8 **TRANSITION** ENGINEERING, INC.

One of the most complete Ethernet product lines manufactured in the USA. "We Make Networking Simple"

9 **CORE** INTERNATIONAL AN AIWA COMPANY

CORE International, Inc. offers high-performance storage solutions, including COREarray open, scalable disk array subsystems; high-performance COREdisk hard drives from 1 GB to 9 GB; and COREtape tape backup drives.

10 **J & L**

J & L is the leading manufacturer of remote network communications servers for all PC LAN-based systems.

11 **TELCO SYSTEMS**

The Access 30™ Multiport CSU/DSU provides cost-effective access to network services.

12 **WRIGHT·LINE** technical furniture solutions

Modular Furniture for LAN environments. Design a custom configuration using standard components and reconfigure when your hardware grows or changes.

Send for

FREE

Information

on the latest

products

and **services**

advertised in

LAN WORLD

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO.716 PITTSFIELD,MA

POSTAGE PAID BY ADDRESSEE

NETWORK WORLD

P.O. Box 5090
Pittsfield, MA 01203-9838

PLEASE **fold** AND **tape** ALONG THIS EDGE.

Grand Junction

Continued from page L1

Corp.'s EtherExpress Pro/100 fast Ethernet adapters for Peripheral Component Interconnection- and Extended Industry Standard Architecture-based machines, as well as Sun Microsystems, Inc.'s SunFastEthernet adapters for Sbus-based SPARCstations.

The interoperability with Sun was a key factor for Roger Salisbury, a FastHub beta user and network administrator at NorthStar Financial Group in Chicago. The FastHub gives NorthStar a way to network its Sun workstation users at high speeds and at an affordable price.

"We needed a high-speed solution to connect all our Sun users together and determined that ATM just wasn't there yet and FDDI was too expensive," Salisbury said. "Since Sun is going to begin shipping 100M bit/sec Ethernet on its motherboards, it made sense to look at fast Ethernet technology.

"While I don't need that type of bandwidth down to every desktop, I can gain more aggregate bandwidth with FastHub," Salisbury added.

"And 16 ports for under $4,000 makes it a cost-effective investment," he said.

While FastHub makes sense for the contained workgroups that NorthStar supports, the device may be a little ahead of its time, according to Melinda Le Baron, program director at Gartner Group, Inc., a consultancy based in Stamford, Conn.

"Because there are currently no routers that offer fast Ethernet interfaces, FastHub cannot play well in collapsed backbone environments," she said. "When router ports do become available — and the earliest looks like 3Com [Corp.'s] sometime in the first half of 1995 — then Grand Junction will be in a good position."

FastHub is available for $3,995, which is less than $250 per port.

INCREASED WARRANTY

In a related action last week, Grand Junction announced that it was increasing its present one-year warranty to three years.

The warranty, effective immediately at no additional cost to users, will apply to the company's new and installed FastLink hub and adapter products.

✆Grand Junction: (800) 747-3278.

Hubs

Continued from page L7

small chassis or 64 in the large chassis.

Token ring, FDDI and ATM are supported by a dual-slot High Speed Switching Module (HSM) that supports any mix of two token-ring, FDDI and ATM submodules. This facilitates ease of migration from one LAN type to another. The token-ring module provides six ports, enabling the OmniSwitch to support up to 24 or 48 4M/16M bit/sec token rings in a five- or nine-slot chassis, respectively. Single-port DAS and four-port SAS FDDI submodules can be mixed or matched in the HSM.

The ATM submodule provides one or two OC-3 ports and connects to multimode fiber via an SC port connector. It supports LAN emulation (LAN mapping to ATM), AAL 3/4 and 5, PVCs and SVCs. Each port of the two-port ATM submodule can be connected to a different ATM switch for redundancy.

The OmniSwitch provides fault tolerance through hot-swappable modules and optional dual power supplies and cooling fans.

Each of these next-generation products promise users improved LAN performance while providing a migration path to ATM.

A Management Processor Module (MPM) is required in each OmniSwitch, providing an SNMP agent that can be managed from an SNMP console or an ASCII terminal using telnet. It runs under HP OpenView for Windows or Unix, IBM NetView/6000 or SunConnect SunNet Manager.

This module supports a moderate level of routing; however, additional routing requires that a second MPM be used as a route server, which is implemented in software.

Where the number of network users are too few to consider the cost of the OmniSwitch, Xylan provides a miniversion called the PizzaSwitch to satisfy minimal network needs.

Each of these next-generation products promise users improved LAN performance while providing a migration path to ATM. The products preserve investment in existing infrastructure because they do not replace any existing network components.

Of the products reviewed, NetEdge and Xylan provide the most flexibility. They not only provide Ethernet switching, but also support token-ring switching, FDDI backbones and ATM migration.

➾Axner is president of DAX Associates, a consulting firm in Oreland, Pa., that specializes in internetworking and presents ATM seminars. He can be reached at (215) 886-1820.

FaxNET - the one hour free information resource from *Network World.*

Do you need more product information?
Do you need updated specifications?
Do you need it NOW?
Then call Network World's FaxNET today.

By calling toll free 1-800-664-8271 you can receive within one hour in-depth product information on the following companies.

ADC Kentrox	36080
J&L Information	36110
Micom	36090
Netmanage	36120
Rad Data	35030
Sanyo/Icon	36100
Telco Systems	35070
Transition Engineering	36130

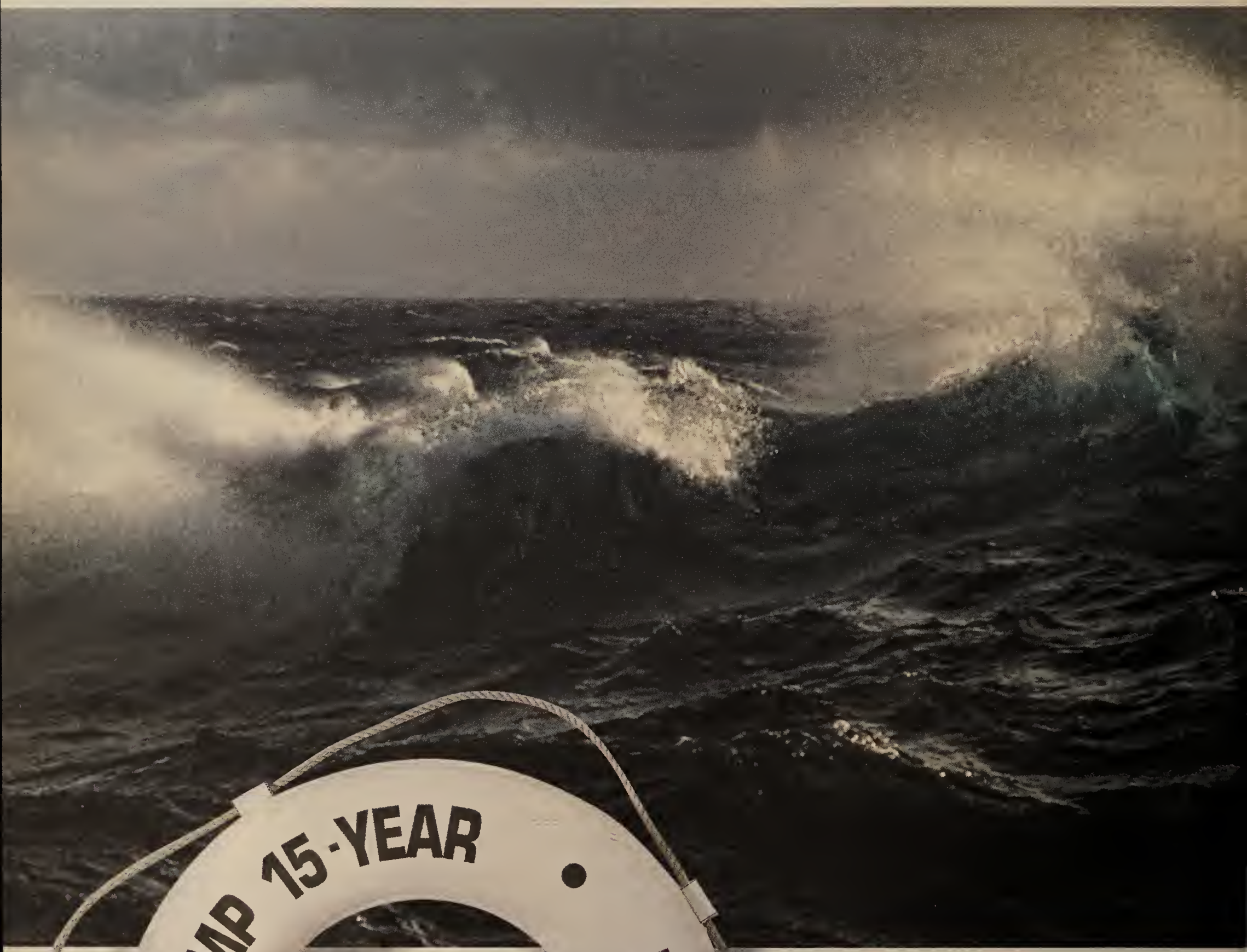
Here's how it works

- Dial 1-800-664-8271 on your touch tone phone.
- You will be asked to key in the 5 digit number of the advertiser that interests you.
- Follow the voice menu instructions and you will receive the requested information within one hour.

There is no cost to you and you get the information when you want it.

1-800-664-8271

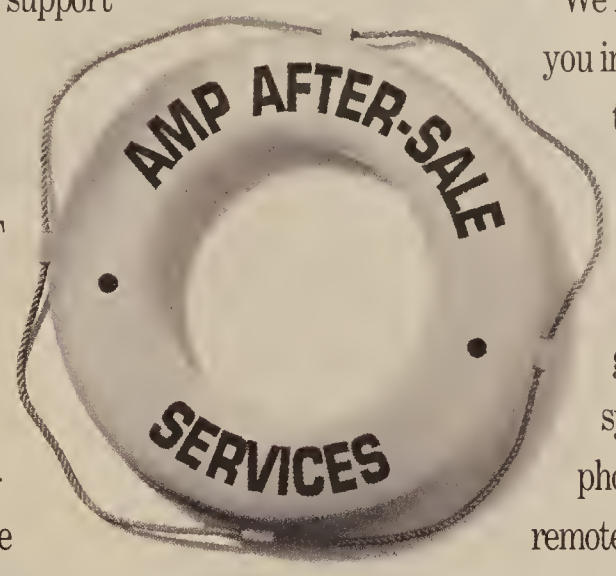
In the turbulent world of network cabling, where can you turn for help?



Turn to us. AMP now offers complete design, installation, certification, warranty, and after-sale support of premises cabling systems – with some very special advantages.

AMP NETCONNECT Open Cabling Systems are based on ISO/IEC and EIA/ TIA standards and recommendations. And because we're AMP, you get total flexibility in the choice of media and distribution. If your system requirements include fiber, UTP, coax, or a mix, we'll meet your needs, all within globally established standards and recommendations.

After installation by an Authorized AMP NETCONNECT Design and Installation Contractor, your system will be tested and certified to meet the link performance of the same standards – that it actually operates to spec, at rated speed. And we provide a 15-year warranty on performance. Your cabling will meet your current needs, and will be there for you in the future when new hardware and new user demand require it.



We'll be there for you in the future, too – with all the help you need in the management and growth of your system. We offer phone support for remote diagnostics.

And we provide on-site help for everything from major expansion to routine adds, moves, and changes. We also provide training, and certified NETCONNECT Designers and Installers to perform warranty work and dispatch service.

If you needed this level of service before, you had only one vendor to turn to; now you have a choice. Make the smart one. Call us today.

AMP and NETCONNECT are trademarks.

For more information on AMP NETCONNECT Open Cabling Systems, call us at 1-800-722-1111 and ask for the Network Action Center. AMP, Harrisburg, PA 17105-3608. In Canada call 905-470-4425.

AMP

Circle Reader Service #1

CHAMELEON 4.0

NEW VERSION!

TCP/IP Applications for Windows

24 WINDOWS APPLICATIONS, MORE THAN ANY OTHER TCP/IP PACKAGE.

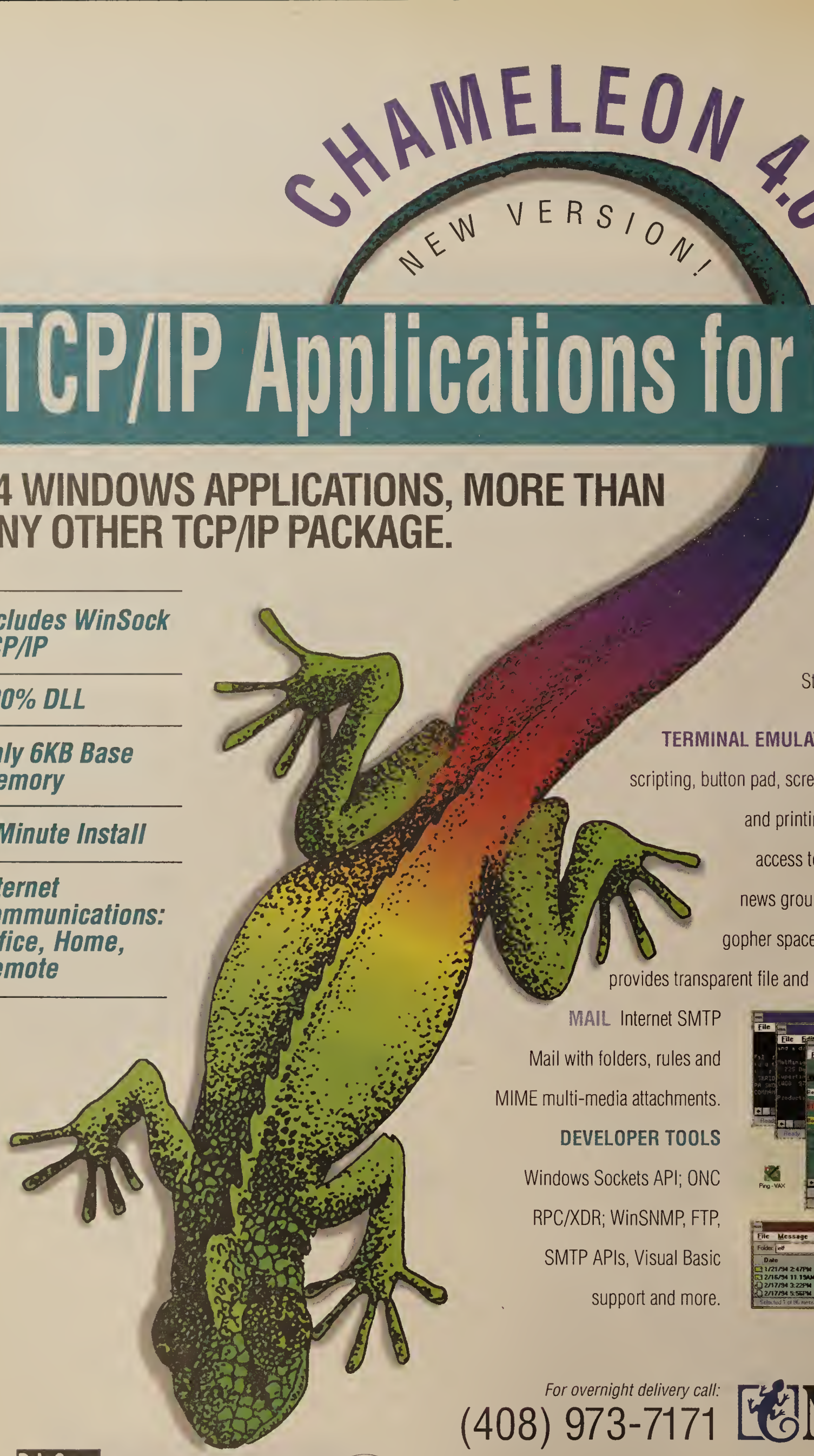
Includes WinSock TCP/IP

100% DLL

Only 6KB Base Memory

5 Minute Install

Internet Communications: Office, Home, Remote



APPLICATIONS Telnet (VT100, VT220, TVI), TN3270, TN5250, FTP (client & server), NFS (client & server), SMTP Mail with MIME, NewsReader, PROFS Mail, LPR/LPD, Gopher, Phonetag, Ping, Finger, BIND, Whois, Scripting, Statistics, Custom, TFTP, SNMP Agent, and more.

TERMINAL EMULATION Advanced features include scalable fonts, scripting, button pad, screen capture, drag-and-drop keyboard remapping, and printing. **INTERNET ACCESS** Easy point-and-click access to the resources of the Internet. Read and post to news groups, download software or documents and search gopher space. **NFS** First ever client and server for Windows provides transparent file and printer sharing (ask for Chameleon*NFS*).

MAIL Internet SMTP Mail with folders, rules and MIME multi-media attachments.

DEVELOPER TOOLS Windows Sockets API; ONC RPC/XDR; WinSNMP, FTP, SMTP APIs, Visual Basic support and more.

Data Comm MAGAZINE TESTER'S CHOICE

BUYERS ASSURANCE SEAL May 1993

For overnight delivery call:

(408) 973-7171

NETMANAGE™

NetManage, Inc.
10725 North De Anza Boulevard
Cupertino, California 95014, U.S.A.
Fax: (408) 257-6405

Circle Reader Service #3

Winning the Windows software distribution battle

WinInstall saves administrators time by automating the process of installing and magaging software.

BY JOANNE CUMMINGS

For many LAN administrators, the arrival of new Windows applications is cause for panic, not celebration.

"You would not believe how long I have cursed this whole thing," said Joey Cartwright, a technical adviser at Federal Express Corp. in Memphis, Tenn., referring to the process of distributing Windows applications across his three-LAN, 300-client network. "I have said to myself many times, 'Why am I sitting here trying to figure this out? It should be easier than this.' "

On Demand Software & Services, Inc. thought so, too. Its WinInstall product, which is winning praise from many early users, is designed to automate the distribution and installation of Windows programs in network environments.

The program has enabled Cartwright to cut the time it takes to distribute a new application from weeks to hours.

The problem with deploying Windows applications is the complexity of the programs, these users say. When Windows programs are installed, they change a myriad of system files, such as the WIN.INI or the SYSTEM.INI, not to mention various Dynamic Link Libraries (DLL).

Although these changes can affect other applications on the desktop, they are almost impossible to detect and track because they can occur in a variety of directories.

To make matters worse, users that try to load their own Windows software using installation programs are typically confronted with questions they don't know how to answer or don't want to know how to answer.

"Most users don't have a lot of PC experience, and there are a lot of mistakes they can make during an install," Cartwright said. "For example, the Word installation asks for a variety of things like what directory you want to use, what network drive you're going to be loading it from and what local directory you'll be keeping your local files in. We didn't really want the users doing it, and they really didn't either. It's not their job."

WALK, WALK, WALK

The alternative is to identify all the PCs that are to get a new package and walk around and install it. "But we don't have enough people on the LAN staff to do that," Cartwright said, noting that the staff numbers only six.

So Cartwright wrote a pile of programs that made it possible to automatically send the latest software and upgrades to each client at Windows startup. "But I was forcing it on them, whether they wanted it or not," he said. "I kept total control over that environment, which was bad because what if they didn't need the application? Why have any of it on the PC?"

So he turned to On Demand's WinInstall program. WinInstall 4.0 eases the process by enabling administrators to track the system changes made during an installation, edit those changes and then automatically distribute the software to the LAN users.

It also gives them the option of making every decision for users or enabling users to make some decisions for themselves. "A user might want to keep the new files in a certain directory," Cartwright noted as an example.

TIME SAVER

The program, which costs $495 per server, has enabled Cartwright to cut the time it takes to distribute a new application from weeks to hours.

WinInstall runs on either a network server or an administrator's Windows 3.X-equipped workstation. It monitors an application's setup routine as it is being loaded on to one of these machines and automatically produces a working .DAT file that includes changes to any .INI, AUTOEXEC.BAT, CONFIG.SYS and REG.DAT files.

Once installed, users can download the application by simply clicking on the WinInstall icon on their PC. This will bring up a list of programs available for loading. Double clicking on the name of a new application will automatically install it.

"Every time there's a new version of something, the users are dying for it," he said.

See **Windows**, *page L14*

Their Readers.

Our Readers.

Network World. Delivering Very Influential Purchasers.

Network World readers — **Network IS** professionals — are no small change. On the contrary, IntelliQuest's Computer Industry Media Study (CIMS) V1.0 proves what we've been saying right along — on average our readers plan to spend more in total on computer hardware, software, peripherals and networking products and services than readers of other networking/LAN publications. No small wonder since CIMS establishes that a significant percentage of computer and related products will be used on a network. Network World, delivers the **Very Influential Purchasers** you need to fatten up your sales — and your wallet. For more information or to request a copy of Network World's IntelliQuest CIMS V1.0 summary, call Evilee Thibeault at (800) 622-1108 x430.

Windows

Continued from page L13

"Before, I had to figure out what changes it was making and how I was going to distribute it. It literally took me a week or two to figure it out. And it didn't always work. But now, as soon as the new app is out, they can have it that day."

WinInstall also enables administrators to uninstall software, which is important in the Windows environment. "Most Windows applications don't have an uninstall feature, which is a pain," Cartwright said. "You may get rid of the icons for programs you don't use any more, but all [the application] is still there taking up space. WinInstall takes care of that."

The program also eases the distribution of other items, such as print drivers and network drivers. "Novell is constantly updating NetWare drivers," Cartwright said. "The user has no idea of where those files need to be, so I just set up a little .DAT file [within WinInstall] that tells it to copy these files to certain directories and then prompts users to reboot. Then they have all their network drivers. No decisions."

Other users are similarly impressed. Terry Bieritz, systems administrator for the Advanced Technology Lab Group at Sequent Computer Systems, Inc. in Beaverton, Ore., uses WinInstall to distribute upgrades for applications *and* operating systems.

Bieritz is responsible for a Windows NT network with 65 clients running Windows for Workgroups.

"We used WinInstall to upgrade users automatically from DOS 6.0 to DOS 6.2 if they needed it, and upgrade them from Windows for Workgroups 3.1 to 3.11 automatically, without them having to answer any questions," he said. "And we did this while Windows was running."

Bieritz said WinInstall enabled him to delete the old version of the software first, install the new version and then check that everything worked.

The entire conversion still took him a month and a half. "But without WinInstall, it would have taken at least three months," he said. He estimates it would have taken his six-person staff one to two hours at each computer to perform the upgrade. "It would have been an absolute nightmare," he said.

"The other option would have been to send detailed instructions and have users install it on their own," he said. "But then the desktop guys would have had to go out and touch every computer anyway just to answer all the questions, like what directory should it be in and what video card do I have."

The only complaint Bieritz offers is about WinInstall's user manual. "It has no error message section," he said. "I have no complaints about the product, and the service is wonderful. It's just that the manual leaves a little to be desired."

A SLAVE TO SETUPS

Jerry Deluyck, a LAN administrator for Motorola, Inc. in Scottsdale, Ariz., who is responsible for about 500 Windows clients working off Unix servers, said he likes the fact that he's no longer dependent on the quality of each application's setup program.

"Before, I had to figure out what changes [the new version] was making and how I was going to distribute it. But now, as soon as the new app is out, users can have it that day."

For example, some Microsoft network programs enable administrators to automatically install them on LAN-attached workstations by using the application's setup program, he said. Administrators can test it on one machine and then copy it across all the LAN nodes, he said. "Word is like that, which makes it easy," he said.

But that is the exception instead of the rule.

"We also use Microsoft Project," he said. "It had this file called NETWORK.WRI, which was essentially a read-me on how to install the product so you could use it from a network file server," he said. "It was about five pages long and tried to tell you how to make all your changes to the WIN.INI and SYSTEM.INI. It was, at best, black magic."

Other programs, such as Corel Draw from Corel Systems Corp., didn't have any documentation at all about doing a workstation install. "They basically left you off on your own," he said.

WinInstall eases workstation installation for all applications, whether they have a good setup program or not, he said.

But perhaps the best part is that WinInstall enables administrators to offer users what they need without intruding into their lives.

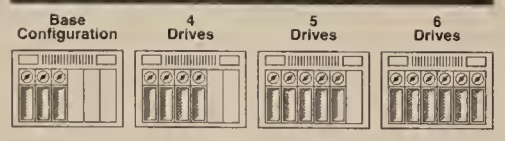
"Administrators, being the well meaning people we are, sometimes don't take things into account," Deluyck said. Like the fact users might be in the middle of a project that has to be finished by the end of the day and don't have time for a software install. "WinInstall tells them [the software is] available and lets them upgrade when they want."

Cummings is a free-lance writer in Marlborough, Mass.

COREarray™ Scalable, Open RAID Solutions

Storage Growth from 2GB to 20GB!

COREarray*20000* Fault-Tolerant Scalability



- *Uses 1GB, 2GB or 4GB Hot Plug 3.5" drives*
- *2GB to 20GB per subsystem; up to 140GB per host adapter*
- *Fast SCSI-2 interface, 10MB/s data transfer speed*
- *Intelligent 32-bit RISC RAID processing with ECC cache*
- *Diagnostics with visual, electronic and audible signals*
- *Comprehensive monitoring software for all major server operating systems*
- *Industry-leading 5-year warranty on all components*

The smart, affordable alternative to mirrored disk solutions

The COREarray 20000 disk array subsystem effectively meets today's server storage demands with a unique combination of scalability, fault tolerance and host independence.

Now you can start with capacity to meet your current needs, then expand as your system grows — simply by adding or upgrading drives. Top performance, including 10MB/s data transfer speed, is constant throughout subsystem growth. And since COREarray 20000 offers a cost per MB that actually *decreases* as you add drives, it is ultimately a more cost-effective solution than mirrored drives.

In addition to RAID levels 3 and 5, COREarray 20000 delivers solid fault tolerance with load-sharing power supplies, built-in diagnostics, automatic rebuild, and Hot Plug® drives — which can be easily replaced while the subsystem is running.

Finally, COREarray 20000 is compatible with all major platforms and operating systems, which means you are free from the costly limitations of proprietary storage solutions!

800-920-CORE, Ext. 3R05
(800-920-2673, Ext. 3R05)

CORE INTERNATIONAL
AN AIWA COMPANY

Core International, Inc., an AIWA Company, 7171 N. Federal Highway, Boca Raton, FL 33487, Phone 407-997-6044, Fax 407-997-6009
Core, Hot Plug and COREarray 20000 are registered or proprietary trademarks of Core International, Inc. Other trademarks are the property of their respective owners.

Circle Reader Service #9

Play to Win

Combination Ethernet + Modem PCMCIA Card.

Introducing the J♦, first in the high performance Trumpcard Family. The Jack of Diamonds is an all-in-one Ethernet and Direct Cellular Data/Fax Modem Type II PCMCIA card. Powered by the fastest Modem on the market (28.8 Kbps!!) and a high performance Ethernet network interface, the Jack of Diamonds enables simultaneous use of the modem and network. Direct cable connections to Ethernet 10Base-T or modem eliminates the need for inconvenient Pods. Effortless connection with either 10Base-T or 10Base-2 is achieved through intelligent media detection, offering true hassle-free connectivity!

The Jack of Diamonds is compatible with all popular operating systems including: Windows NT, OS/2, UNIX, ODI and NDIS, etc. Charged with a Windows friendly hardware design (ensuring maximum data integrity) and a sophisticated power management system, the Jack of Diamonds is the most convenient, versatile, high performance PCMCIA card available today.

All Ositech Trumpcards are backed by a full 5 year warranty, 30 day money-back satisfaction guarantee and comprehensive service/support via our toll-free Hotline and 24 hr BBS.

OSITECH
Communications Inc

COMPAQ Qualified Solution

Call Ositech today for a formal introduction to the Jack of Diamonds and the Trumpcard family. Toll free 1-800-563-2386 Tel: (519) 836-8063 Fax: (519) 836-6156

Compaq Qualified Solution Registered U.S. Patent and Trademark Office.

Circle Reader Service #2

AppleTalk

Continued from page L8

RTMP-60 to entirely supplant RTMP, based on the assumption that all the devices that will see it are AppleTalk routers capable of correctly interpreting RTMP-60, rather than users' machines, which would need to be upgraded to understand it.

The good news about RTMP-60 is that it's simple, effective in the short term, and vendors should be able to develop interoperable implementations relatively quickly. The bad news is that the advantage it provides may be so minor that it's rendered obsolete before implementation, leading both vendors and users to simply skip it entirely.

No router vendor has yet committed to releasing support for RTMP-60, and few users seem impressed by the advantages it offers.

AURP ADVANTAGE

Apple's AURP, as complicated as it may be, does address a much broader range of user needs, making it a more attractive routing protocol in the long run.

Rather than sending the same routing tables over and over again, as RTMP and RTMP-60 do, it only sends a routing table once and then updates it with any changes that may occur, hence the term "update-based."

Since AURP was conceived prior to the intellectual separation of tunneling and WAN routing issues, most implementations tend to address both, using AURP as the routing protocol and AURP-Tr over IP UDP as the associated tunneling protocol. This is not a limitation inherent to the protocol, however, as any reliable carrier protocol will work. The Point-to-Point Protocol is one such notable example.

Where RTMP-60 simply replaces RTMP, AURP completely replaces both RTMP and Apple's Zone Information Protocol (ZIP), which is used to associate human-legible names with numeric network numbers. This allows AURP routers to filter out even more of the traffic that would cross the interconnection by answering ZIP queries via "proxy" on behalf of the router at the other end.

This provides a substantial savings in traffic, as such queries are generated every time an AppleTalk client machine needs to display a list of zones — when a user opens the Chooser on his Macintosh, for instance.This is one of the same methods Apple uses to optimize performance across ARAP dial-up links.

In addition to simply replacing RTMP and ZIP, the AURP specification contains a number of optional features, which router vendors are encouraged to add to their implementations.

These additional features solve most of the architectural problems net administrators are likely to encounter on extremely large AppleTalk net. They include network hiding, net number remapping and clustering, hop-count reduction, best-effort routing loop detection, redundant routes with weighted hop-counts, and an SNMP MIB for managing and monitoring AURP routers.

AURP contains many optional features that solve most of the architectural problems net administrators are likely to encounter on extremely large AppleTalk nets.

Network and device hiding are relatively old hat, as many vendors have implemented these features on top of RTMP. The AURP specification suggests precise methods of accomplishing each, though, and is valuable if only in defining a uniform behavior users can expect from these features.

Network number hiding is performed during route propagation; if you wish to hide a LAN segment from a remote site, its network number is never advertised to that site's AURP router, which cannot then advertise your network segment's zones to its own LAN.

Device hiding is performed by filtering responses to Name Binding Protocol lookups. If you hide a device from other sites, NBP responses from it are simply discarded at your local router.

REMAPPING AND CLUSTERING

Network number remapping and clustering are two of the most important additional features of the AURP specification and will undoubtedly be among the first to be implemented by router vendors.

Since only numbers between one and 65,279 are valid AppleTalk network numbers, and they are statically and manually assigned, conflicts are likely in large organizations. This is particularly true when network connections are extended to join two preexisting networks, such as those at different offices of a large corporation or different campuses of a university.

Network number remapping allows the administrator of each AURP router to define a "safe range" that does not conflict with any locally used network numbers — all remote networks will appear as though their network numbers were within the safe range.

Since the number of networks and routes that might be available through an AURP router could be large, even if a network administrator has used network number hiding judi-

When it comes to cost-efficient network services, Access is key.

Consider the Access30™ multiport CSU/DSU. It economically combines high-speed LAN, voice and video traffic onto a single T1, E1 or fractional network line. Available in two- or four-DTE port configurations, the Access30 complies with international standards so it's ideal for global transmissions.

Now with SNMP. Access every feature—even from a remote terminal.

The Access30 front panel management system provides an instant overview of network functions, configurations and diagnostics. It also offers flexible multiplexing and drop-and-insert connectivity. And easy software upgrades allow the Access30 to keep pace with new technologies and services. What's more, the Access30 is backed with a 5-year warranty.

Reduce your access costs today. Call **1-800-776-8832** for full details on the Access30. Also ask for a free copy of "*The Telco Systems White Paper on Network Access.*"

TELCO SYSTEMS

Access30 is a trademark of Telco Systems, Inc. ©1994 Telco Systems. Network Access Division, 4305 Cushing Parkway, Fremont, CA 94538. 1-800-776-8832.

Circle Reader Service # **11**

ciously, network number clustering is provided to eliminate the burden of advertising numbers within the LAN.

By remapping all the remote networks into a single extended network range and advertising that range, potentially thousands of remote networks could be represented by a single-tuple in your local RTMP packets. This provides a near analogue to the Internet Protocol concept of a "default route."

HOP-COUNT REDUCTION

Since networks large enough to require AURP routing may employ topologies that require packets to traverse many routers, hop-count reduction has been included in AURP's options, as well. Hop-count reduction allows a router to recalculate the hop count of any packet that passes through to ensure the count does not exceed 15, the maximum allowed under AppleTalk, by the time that packet reaches its destination.

AURP also adds a number of features designed to foster the use of multiple redundant paths between networks. Although it fails to go so far as providing a load-balancing mechanism, it does maintain routing and distance information for known paths to remote networks and can switch from routing packets through one path to another if the first can no longer be traversed.

Since different routes may have different real-world costs associated with their use — for example, one may be a fixed-cost frame relay link, while another may be a pay-per-packet X.25 link — hop counts can be manually weighted to encourage the use of less expensive but longer routes.

Since multiple routes make the danger of routing loops much greater, the AURP specification also defines a new type of RTMP packet — an RTMP Loop Probe — which can be sent out of any router interface and detected if it returns through any of the other interfaces.

Lastly, Apple has defined a standard Simple Network Management Protocol Management Information Base (MIB) to provide a consistent interface by which AURP routers can be polled, monitored and configured.

With this feature set, it's not surprising that AURP has found a following among large-site AppleTalk network administrators.

Currently, Apple and Farallon Computing, Inc. are the only vendors shipping products that support AURP routing, but Cisco, Wellfleet Communications, Inc. and Sony Corp. have all demonstrated working prototypes.

Cisco is likely to be the next vendor to ship, with release of AURP support slated for mid-October, along with a number of other AppleTalk routing enhancements.

According to Christine Hemrick, product marketing manager for routing software at Cisco, the firm expects to add network number remapping, hop-count reduction and loop detection in the first quarter of 1995, and it may possibly pursue additional capabilities, such as the much-demanded zone-name filtering, thereafter. Other vendors have not yet announced release dates.

Although RTMP-60 is a simple and easily implemented augmentation of Apple's existing routing protocol, it's too little too late. AURP presents a much greater array of features. It will soon be supported on all the largest enterprise-scale routers, and smaller router vendors should fall into line soon thereafter.

Woodcock is president of Zocalo Engineering, an AppleTalk and TCP/IP network design and installation contracting firm in Berkeley, Calif.

HP includes new optical, tape systems in its LAN storage line

BY PEGGY WATT

Palo Alto, Calif.

Hewlett-Packard Co. pushed further into the LAN storage systems market last week, announcing new tape and optical storage systems, as well as two disk drives.

The products, all scheduled to ship in November, are the first out of the chute from HP's newly renamed Information Storage Group. The unit, formerly called the Mass Storage Group, will market integrated, multivendor storage systems through value-added resellers (VAR) and systems integrators.

The products build on HP's already sizable share of the storage market. According to a survey by market research firm International Data Corp. (IDC) in Framingham, Mass., HP holds 44.8% of the tape drive market. Freeman Associates of Santa Barbara, Calif., a market research firm, said HP has a 37.5% of the optical drive market based on sales.

FOR SURESTORE

HP's new SureStore Optical 20xt LAN Jukebox is a network-ready 20G-byte unit that can connect anywhere on a LAN, not only through a server, but also via telnet. Its initial release is only for Unix-based Network File System LANs, but a NetWare version is sched-

See HP, *page L18*

Quarterdeck to bring X Window System to MS Windows users

BY PEGGY WATT

Santa Monica, Calif.

Quarterdeck Office Systems, Inc. is developing a tool to let Windows users participate in electronic mail and other exchanges on Unix LANs as if they were on a Unix terminal.

Users of the new desktop-based product, code-named Quixote, will be able to launch remote Unix-based X Window System applications directly from the Microsoft Corp. Windows Program Manager, said Brad Peppard, Quarterdeck's marketing director. The software uses icons to represent X Window System applications, making them look like local Windows programs, he said.

The software will give users the best of both the Windows and Unix worlds. Users will still be able to take advantage of such Windows features as cut-and-paste, even moving data between Unix sessions and Windows applications, Peppard said.

Quixote's display is compatible with major font types, and the mouse can be set to emulate the three-button commands used in Unix.

"It gives you the advantages of access to a Unix host within a Windows desktop," Peppard said.

Quixote's built-in net browser is designed to locate and retrieve any applications that can run in the X Window System session. The program supports telnet and serial communications, plus VT-52, VT-100 and VT-200 emulation, and standard File Transfer Protocol.

Users can take advantage of network printers and any remote access available through the Unix LAN.

The product is scheduled to ship by the end of the year under the name Windows X Server.

The new software is intended as a partner product to DesqView/X, Quarterdeck's DOS port of the X Window System. Recently updated to DesqView/X 2.0, the product now has TCP/IP support built into it. Also, it can translate commands between DOS and the X Window System on-the-fly, so that DOS users can be part of a Unix network.

Quarterdeck's latest product foray into Unix is intriguing and puzzling, said Rob Enderle, an analyst with Dataquest, Inc. in San Jose, Calif. "An administrator might use it, but why would a company buy a lot of copies of it?" he asked. "Usually you don't want to run both operating systems on your desktop — you'd rather the second one look like the one you're more familiar with."

✆Quarterdeck: (310) 392-9851.

HP

Continued from page L17

uled to ship next year, said Tex Schenkkan, marketing manager.

The jukebox can hold 16 optical disks; its $12,995 entry-level price includes two drives.

Bob Bates, systems manager for Woodward Governor Co., a Fort Collins, Colo., manufacturing firm and a beta test site for the optical drive, said his company will use the optical disk system to store text and images for about 75 users on a Microsoft Corp. LAN Manager network. He said the system requires a 20- to 30-second delay in accessing files.

"The accuracy of the retrieval and having the information on-line far outweighs any delay in seek time."

"The accuracy of the retrieval and having the information on-line far outweighs any delay in seek time," he said.

The seek-time delay is "much better than spending 10 to 15 minutes shuffling paper," which was the company's previous primary storage device, Bates added.

However, by not shipping Novell, Inc. NetWare or other LAN versions of the SureStore jukebox until 1995, HP leaves open a window for competitors, said Patty Chang, a principal analyst with Dataquest, Inc. in San Jose, Calif.

The HP SureStore Tape 12000e includes a 1G- to 5G-byte digital audio tape product for NetWare and Windows NT, bundled with Palindrome Corp.'s Backup Director for the Workgroup, which is software that runs the backup system. Pricing starts at $3,650.

HP's new disk drives are the 1.05G-byte HP SureStore 1000S and the 2.1G-byte HP SureStore 2000S. Both are certified for use with NetWare, The Santa Cruz Operation, Inc.'s SCO Unix, Windows NT and HP-UX. Each carries a five-year warranty and a 20M bit/sec access rate, said Jan Bell, product manager for the offering.

The 1000S costs $884, and the 2000S is priced at $1,784.

✆HP: (800) 826-4111.

Circle Reader Service #5

NET RESULTS

by Mark Gibbs

User interfaces and wild dreams

While Windows has made dragging the less technical users into the age of personal productivity somewhat easier, it isn't as profound a solution as it is often made out to be.

"Ah," you say. "Here comes another well-deserved attack on the fragility and unreliability of the desktop with which I have a love/hate relationship."

But no. The problem that has bothered me for years is simply that to use Windows, you've got to know a lot about it; the operating system simply isn't intuitive.

In other words, in place of the cold hostility of the command line interface, we now have the full-color, all-singing, all-dancing, three-ring circus. You are now cast in the role of ringmaster, and none of the performers will pay attention until you learn to speak the curious language of the circus.

There has to be something better.

Various companies have, in fact, attempted to improve on the existing user interface models by implementing graphical metaphors that try to present a computer environment in more friendly terms.

The latest vendor to get into the metphor business is Novell, Inc. Big Red is developing a front end to NetWare networks dubbed Ferret that runs under Windows. Nobody has yet confirmed that this is an intentional pun on the Internet's famous tool called Gopher, but I think we can see a tongue wedged firmly into a corporate cheek there.

Ferret presents the user with a picture of an office. There's a desk, a computer, a calendar, a filing cabinet and so on, and other images can be added for more services. Want to open a file? Guess what, you click on the filing cabinet. Want to read your mail? Click on the inbox.

And so on. Death by metaphor.

Sure, it makes access to functions obvious. But it doesn't really address the core issue of interface simplification, because behind all of the graphical user interface glitz will still be the same old applications.

While the industry should applaud all initiatives to make the use of computers easier, let us keep these kinds of experiments in focus. They are the digital equivalent of the emperor's new clothes.

Do I have a better solution? Glad you asked.

Here at the Gibbs Institute's Think Tank, we have conceived the ultimate answer to the network user's interface problems. We call it Gibbs World (tm).

We propose to use off-the-shelf virtual reality equipment to give the user a metaphor that is truly easy to understand. Each user will have a room — a personal workspace — that we call an office. In the morning, the user will enter the office and don his or her virtual reality helmet and gloves. A virtual desk will spring into existence along with a virtual filing cabinet, a virtual fax machine and virtual in and out trays.

The user will, for the time being, sit in a real chair. We haven't solved the virtual seating problem yet, and many of our victims . . . err, I mean, our test subjects, have sore butts to attest to the difficulty of the challenge.

To send electronic mail, you pick up your virtual pen, grab virtual paper and write. Then you pop it into a virtual envelope and stick it in the virtual out tray. To send a fax, you just put the virtual document into the virtual fax machine and press the virtual send button.

The technical beauty of our system is that the user never sees computers at all.

Our next project is to see if we can go from this virtual environment to one that is even more real. Our thinking is that we could actually build real equipment out of solid materials — we favor wood, paper and plastic.

We now predict that the computer industry will rush to our door and make us rich beyond our wildest dreams. Our dreams are pretty wild.

➟Gibbs is a consultant and writer in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

ENTERPRISE DATA MANAGEMENT

Centralize and Manage Your Data Storage with Ultra High Performance LANser™ MRX™ RAID Systems from Sanyo Icon

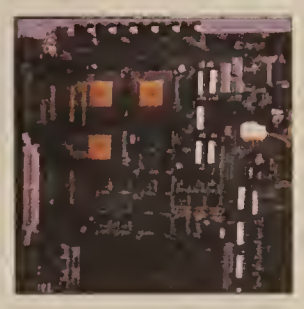
For supplying enterprise-wide LAN storage requirements nothing can surpass Sanyo Icon's LANser MRX (Multiple Raid eXtended) family of data management systems. Not all networks are alike. Many run multiple operating system platforms and LANser MRX systems can support simultaneously multiple platforms, hosts and servers.

Because not all data are alike, LANser MRX allows you to configure multiple RAID levels to match the desired levels of data fault tolerance – from mission critical to the not so mission critical.

Every LANser MRX provides superior data management utilities, RISC powered intelligent data caching, fast SCSI 2 connections and they are available in models with capacities varying from 10GB to 3.2TB (terabytes). We believe in providing a total, enterprise-wide solution to your data storage requirements.

LANser MRX systems are installed at hundreds of Fortune 1000 locations with high performance workstation platforms where speed and performance as well as extreme reliability are demanded. To find out more about Sanyo Icon's enterprise data management, call us today.

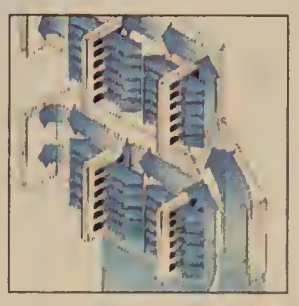
MRX alactronics faatura high performanca 88100 RISC processor and up to 512MB cache and Sanyo Icon's performanca rich oparating system designed to manage disk activity.



"Warm Plug" Disk Array Stacks are designed for on-site installation and maintenance. Electronically controlled solenoids are employed to prevent accidental removal.

MRX's 3 for 2 hot-swap Distributeo Power Modula Stack is designed for maximum reliability and redundancy. Mada from excaptionally high MTBF componants for maximum reliability.

Maintalning corract temparature is critical to prolonging the lifa of data and alactronics. Wa amploy variabla speed air blowars, spacially designed airflow planums, tamparatura sansors and ambedded controllers to adjust the air flow to meat tamperatura requiremants.



SANYO ICON

Ultra High Performance Network Products

18301 VON KARMAN, SEVENTH FLOOR, IRVINE, CA 92715 TELEPHONE 714-263-3777 FAX 714-263-3758

Circle Reader Service #7

See and respond to multi-media messages from your desktop.

How do you *take* 30 orders, fax 30 receipts, and work *with 3 foreign offices* before you wake up?

Use voice response to let customers help themselves.

Do business anytime, anywhere with a global network.

It's the new office. But it's not what you think. It's an office without walls or desks. Without the rules of time or place. It lets you work the way you *want* to, instead of how you have to.

It can all happen, with AT&T's INTUITY™ Multi-Media Solutions. An ever-expanding communications framework that plugs you into all the latest technology as it happens.

INTUITY Solutions let you market to your customers in innovative ways. Free you from routine tasks. Open your office to the rest of the world. And to the future.

AT&T can do all these things for you today. And with the integration of fax, interactive voice, data and video, you'll be able to do things you never imagined.

Call AT&T Global Business Communications Systems at 1 800 325-7466, ext. 534. Find out how INTUITY AUDIX® Solutions and INTUITY CONVERSANT® Systems can help set you free.

AT&T. Where innovation leads.

AT&T

©1994 AT&T

ISDN Anywhere? Not quite

To fill service gaps, D&B builds nondigital flexibility into its telecommuting program.

BY DAVID ROHDE

Berkeley Heights, N.J.

Take Joe Bruggeman's word for it: If you're counting on universal availability of ISDN lines throughout a region to launch a telecommuting program, you may be waiting a long time.

According to the networking executive at Dun & Bradstreet Information Services, based here, managers under the gun to provide remote LAN access to telecommuters should count on gaps and hidden costs in so-called ISDN Anywhere programs — no matter what the telephone companies say.

Bruggeman should know. Like many net managers in large metropolitan areas affected by looming air-quality regulations that are forcing the telecommuting issue, he cannot afford to wait for a perfect world of seamless remote dial-up into LANs through ISDN Basic Rate Interfaces.

Not all of D&B Information Services' 75 employees who plan to telecommute will get ISDN BRIs at their homes via Bell Atlantic-New Jersey's ISDN Anywhere program. As for the rest, Bruggeman is working on alternatives to maximize the ease of use for telecommuters while minimizing the firm's costs.

Bell Atlantic is the pioneer in providing ISDN Anywhere. The carrier installs dedicated links between its bigger, ISDN-capable central offices and its smaller, non-ISDN-capable COs, with BRI Termination Extender (BRITE) cards at either end. In this fashion, the phone company ostensibly provides ISDN capability to all potential users, with no added cost to those whose nearest serving CO doesn't have the ISDN ability.

ALWAYS A CATCH

The catch, Bruggeman has found, is that non-ISDN COs tend to be located in less densely populated areas, and many users are located three miles or more from the switching office.

That triggers a requirement on the phone company's part to install a repeater to carry the digital signals.

The requirement results in a mandatory additional charge for each home user, Bell Atlantic officials confirmed. Bruggeman said he is being charged up to $3,000 for these repeaters and is negotiating with the carrier to prorate the costs over 24 months, bringing the added charge down to $125 a month.

Compounding the problem, Bruggeman is finding that not all employees are even served by the same local carrier. Some of their homes are served by United Telephone of New Jersey, not Bell Atlantic. For this independent operating company — part of Sprint Corp.'s group of local carriers — ISDN is either not available or requires longer lead times, he said. So some of the non-ISDN users will be using switched 56K bit/sec lines, and others — at least at first — regular analog lines.

Even if all the employees were served by the same local exchange carriers (LEC), some of the workers are still located outside the local access and transport area (LATA) in which the firm's headquarters lies, Bruggeman said.

As a result, no LEC would be allowed to carry the dial-in LAN traffic, meaning that calls would have to go through MCI Communications Corp.'s points of presence. So Bruggeman is considering an 800 number for telecommuters to dial into.

But even within the LATA, the user is vulnerable to surprise toll charges.

Pat D'Innocenzo, Bell Atlantic-New Jersey's product manager for ISDN services, said when the nearest central office does not have ISDN capability itself but is backhauling it from a bigger CO, the local calling area is defined by the distant CO, not the nearest one. So what could have been a local call under ordinary analog telephony now might engender a toll.

KEYS to the MOVE

When setting up ISDN-based telecommuting programs, D&B's Bruggeman suggests you:

- **Negotiate or prorate home-to-central office excess mileage charges.**
- **Obtain hubs or remote servers that support digital and analog interfaces into the phone net.**
- **Consider switched 56K bit/sec services in areas where ISDN provisioning could be difficult.**
- **Be aware that carrier back-hauling can skew local calling areas and increase toll charges.**
- **Consider having home users dial in to 800 numbers and negotiate bulk discounts on combined inbound/outbound calling plans.**

Resellers' entry into U.K. mart may mean low prices

BY BILL BURCH

Washington, D.C.

Moves to let resellers into the market for voice lines between the U.S. and the U.K. could mean deep cuts in prices for virtual private network (VPN), direct dial and 800 services, industry insiders said last week.

Allowing resale for calls between the U.S. and U.K. would provide a way around the accounting rate mechanism that currently inflates the price of international calls. As resellers begin to offer voice connections, current carriers will be forced to lower prices, some analysts predict.

The Federal Communications Commission got the ball rolling on international resale last month with conditional approval for ACC Global Corp. and Alanna, Inc. to resell connections to the U.K., saying that the country offered "open entry for and nondiscriminatory treatment of U.S.-based resellers."

Once U.K. regulators make an equivalent finding for the U.S. market, ACC and Alanna can begin reselling the lines, the FCC said.

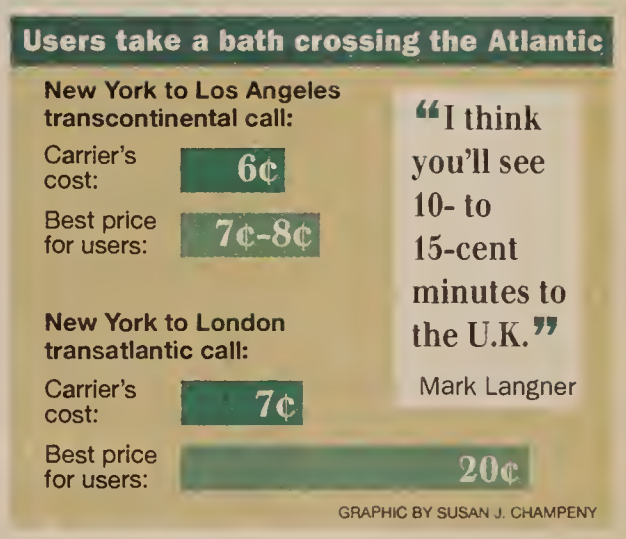
U.K. officials refuse to commit to a timetable, but executives at AT&T, the primary U.S. carrier on the route, predicted that a decision would be reached shortly.

Once resale is legal, two factors should force prices down, analysts said.

First, reseller entry into the market will pressure current carriers to cut prices. Second, current carriers will have the flexibility to become resellers themselves, buying up capacity from other owners of capacity on transatlantic cables.

International calls have long been priced according to accounting rates, whereby carriers paid each other for carrying calls. A carrier that sends more calls than it receives has to pay for those excess calls delivered by the receiving carriers. For example, AT&T pays BT 31 cents per minute under its accounting rate agreement.

Currently, calls to the U.K. are expensive. With AT&T, direct-dial calls between the hours of 7 a.m. and 1 p.m. EST — prime time for reaching businesses in the U.K. — run $1.73 per minute for the first minute and $1.13 for each additional minute. Rates are better for large business customers but are still far above cost (see graphic).



Resellers will likely have room to underprice current rates. The resellers will wind up paying around 11 cents per minute for transport, according to Olga Chandra, a spokeswoman with AT&T's Global Services Strategy unit.

That will leave resellers plenty of room to lower prices, particularly for small to midsize companies.

"The competitive pressures are going to come

See Reseller, *page 38*

BRIEFS

Bay Area Rapid Transit (BART), the San Francisco-area subway system, has signed a **$38.5 million** contract with **MFS Network Technologies, Inc.** for an 82-mile Synchronous Optical Network (SONET) net. BART plans to employ the SONET ring, and will resell capacity in the network conduit to local and long-distance carriers as well as paging, cellular and cable TV providers. The work by MFS Network Technologies, an affiliate of competitive access provider MFS Communications Co., is expected to be completed by 1997.

As of tomorrow, **Internet** users will be able to browse a collection of **telecommunications publications on-line** at a World-Wide Web site set up by **WilTel, Inc.** Information available at the site will include:

- Back issues of the *Long-Distance Digest* and *TELECOM Digest* publications;
- Analysis from Insight Research Corp. in Livingston, N.J.;
- Working papers from the Research Institute for Telecommunications and Information Marketing;
- Recent postings to the Internet's telecomreg mailing list, and;
- A glossary of 700 telecommunications terms.

The site's universal resource locator is http://www.wiltel.com/library/library.html.

In a memorandum of understanding signed last week, **BellSouth Corp.** agreed to assist **China** in developing cellular, wireless and long-distance networks. The carrier will be working with China United Telecommunications Corp., Ltd., a recently formed partnership of the country's power, railways and electronics industries ministries.

Following the death of the sweeping Senate telecommunications bill that attempted to force both competition and universal broadband networks, **Reed Hundt, chairman of the Federal Communications Commission,** has been urging industry groups to continue to push for competition while muting references to broadband build-outs. In a speech last week to the United States Telephone Association, he appeared to suggest simple analog communications in public institutions would be sufficient.

Support. That's what we're talking about here. The cabling support you need to handle all the applications you're moving onto your network today, as well as all the data traffic you know you'll be adding as you grow. Understanding why you need to upgrade your cabling system isn't hard. And now it's just as easy to find someone you can trust to put it all together.

UPDATING YOUR STRUCTURED CABLING SYSTEM IS ONE THING.

MAKING SURE IT WILL SUPPORT YOUR NETWORK IS ANOTHER.

Anixter. *Nobody knows networking like we do. Especially from the ground up. No other supplier can offer you more choices of structured cabling systems. Along with the design and post-installation expertise and support to help you manage your network. When it comes to structured cabling systems, there's really only one place to land:*

1-800-ANIXTER

ANIXTER

FCC challenged to go last mile in deregulating AT&T

BY JOANIE WEXLER

AT&T has taken another stab at getting the FCC to lift the remaining regulatory constraints the carrier claims are crimping its ability to quickly get services to market.

AT&T filed a proposal with the Federal Communications Commission that would allow it to operate under exactly the same regulations as the rest of the long-distance industry, freeing the carrier from the lengthy scrutiny process of its tariff filings.

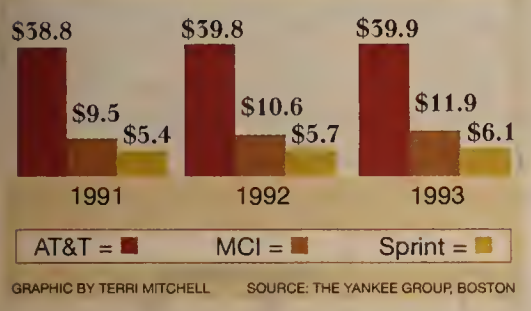
In return, AT&T said it would roll back rates for low-income and low-volume consumers and freeze them through 1998.

AT&T's chief complaint is the 14- to 45-day waiting period after it files a tariff before it can bring a service, price change or promotional offer to market. This gives competitors time to examine AT&T's competitive moves and respond ahead of time or simultaneously, said Alex Mandl, AT&T executive vice president.

Still the leader

AT&T's market share dropped 3 percentage points in 1993 — from 67% to 64% — though the carrier remains far ahead in terms of revenue.

Long-distance revenues (in billions)



GRAPHIC BY TERRI MITCHELL SOURCE: THE YANKEE GROUP, BOSTON

AT&T is also asking for relief on Computer Inquiry III stipulations barring it from bundling equipment and services under one contract. AT&T proposed the price protection trade, Mandl said, because FCC Chairman Reed Hundt has concerns about the effect a nonregulated AT&T would have on low-end users. Analysts said this is particularly an issue with AT&T, which has the majority of the mart.

Frequent basic service price hikes from AT&T and its rivals over the past two years have predominantly affected low-volume users with little bargaining power for discounts.

AT&T proposes rolling back its basic service rates for low-volume users to what they were at the beginning of 1993, an average of 15.6 cents per minute compared with today's average 17.1 cents per minute for 30 minutes of calling per month, AT&T officials said.

Some large corporate customers pay 5 to 7 cents a minute because of volume discounts.

For infrequent callers, AT&T would offer an option of a $4 monthly charge for 30 minutes of night and weekend calling.

Some corporate users felt AT&T's proposal still leaves it at a disadvantage.

"I think AT&T deserves equal status, but perhaps the burden of protecting low-volume customers should be shared among all providers," said Vi Nicholson, director of corporate telecommunications services at Trimble Navigation in Sunnyvale, Calif.

Since AT&T's divestiture a decade ago, the industry has seen steady deregulation of AT&T in the form of its ability to offer contract tariffs and heavily discounted Tariff 12 packages and to give virtually no notice on tariff filings.

"What this proposal puts on the table is the question of whether the FCC wants to finalize the transition in AT&T long-distance regulation so it is treated just like any other long-distance company," said Brian Moir, legal counsel to the International Communications Association (ICA) user group. "This is the last step, and it forces the issue."

The ICA has yet to go on record as to whether it thinks AT&T still requires more regulatory oversight than its competitors.

Others took more of a stand. "It's absolutely time for this," said Elizabeth Gemberling, a telecommunications planner and support staff member with Sony Music Entertainment, Inc. in New York. "Sprint and MCI have had an open market, and AT&T hasn't had its fair shake."

But those that compete with AT&T have a different view. "AT&T is still too big and predatory and has too much money. If the FCC lets them go, they'll end up owning MCI and Sprint," said the owner of a Carrollton, Texas, telecommunications equipment company who asked not to be identified. His biggest concern was the relaxation of regulation on the equipment side. "I still watch AT&T with a real jaunticed eye," he said.

AT&T's services competitors also oppose the FCC granting tariff review relief to AT&T. A Sprint spokeswoman said in a statement, "To the extent that AT&T still retains market dominance, there is a need to regulate in order to prevent any abuse of that power."

FOR MISSION CRITICAL ENTERPRISE NETWORKS, NO COMPANY IN THE WORLD IS MORE RELIABLE. BUT WHO CARES?

Ask Ford, Dow Jones, SGS-Thomson Microelectronics, Petrobrás, Samsung and more than 100 leading corporations worldwide. They'd agree that Hughes provides wide area transport networks that they can count on.

At Hughes Network Systems, our success is measured by the success of our customers who choose the complete system control and 99.999% reliability of our enterprise networks because their businesses depend on it. For more information, call Hughes at 800 203-2278. ***The Best Value in Global Networking.***

HUGHES NETWORK SYSTEMS
A unit of GM Hughes Electronics

Telcos to offer videoconferencing bridging

Pacific Bell and BellSouth will give long-distance carriers a run for their money.

BY BILL BURCH

San Francisco

At least two local Bell telephone companies will soon be joining long-distance carriers with videoconferencing services that offer multipoint bridging.

Pacific Bell and BellSouth Corp. have both laid out plans for multipoint services that operate from 112K to 1.5M bit/sec and are based on the H.320 set of videoconferencing compression standards.

PACIFIC BELL.

Pacific Bell expects its service to be available by the end of next month at a price that is one-third that of a comparable AT&T service.

The telephone company will charge $40 an hour for each port, meaning all users tied into the videoconference pay that rate — a standard pricing practice for such services. Buying 15 hours per month brings the price down to $35 per hour; purchasing 30 hours per month drops the rate to $30 per hour.

"Pacific Bell is definitely on the low side," said Christopher Finn, an analyst with TeleChoice, Inc. in Verona, N.J. For example, Sprint Corp. charges $45 for a 112K bit/sec connection and $60 per hour for higher speeds, he said.

At AT&T, multipoint videoconferencing costs more than $60 per hour, with an actual rate of $1.04 per minute. However, AT&T can save users money by billing by the minute, while Pacific Bell bills in quarter hours.

Another advantage for AT&T is wider coverage with its multipoint bridges. Pacific Bell is deploying bridges only within its home state of California.

Both carriers leave users responsible for long-distance charges, which could quickly negate Pacific Bell's lower rates for users with sites outside the state.

BellSouth, meanwhile, is planning its multipoint videoconferencing service rollout for mid-1995.

Initial plans call for bridges in BellSouth's 28 largest cities, but the carrier eventually plans to offer the service throughout its region. Pricing has not been set as of yet.

Overall, the local carriers' multipoint videoconferencing services will likely attract a different set of users than the long-distance carriers', Finn said. With their limited wide-area support, the services will be strongest for videoconferencing applications within a metropolitan area, such as distance learning, he added.

Michael Yoakam, director of distance-learning programs for the School of Continuing Studies at Indiana University in Bloomington, said he is pleased by the local carrier entry into the videoconferencing market.

"It's going to be a competitive environment immediately," said Michael Yoakam. "Pacific Bell now has cut the price in half."

"It's going to be a competitive environment immediately," Yoakam said. "Pacific Bell now has cut the price in half."

Yoakam currently is assembling a video network that will span eight campuses within the state. He is trying to piggyback the network onto a statewide voice network, but differences in traffic patterns between voice and videoconferencing traffic are making the adaptation difficult.

While voice calls are relatively short in duration, classes given via distance learning typically stretch for an hour. Also, Yoakam is wrestling with line-quality problems and needs echo cancellation for the videoconferencing network.

The school hopes to have the video network in place this January and is in discussions with Ameritech Corp., the local carrier, about a videoconferencing service.

Ameritech plans to launch a bridged video service as soon as regulators in its territory approve tariffs. The service will be able to connect as many as 28 sites.

The bridge service is part of a broad video product launch by the carrier.

Ameritech will also be offering a digital broadcast video service and a dial-up public video network.

Reseller

Continued from page 35

from smaller carriers getting into the marketplace and eating [AT&T's] lunch on price," said Mark Langner, a senior consultant with TeleChoice, Inc. in Verona, N.J.

But analyst Len Elfenbein with WorldLynx in Little Falls, N.J., offered a dissenting view: "The impending threat of simple resale is really a paper tiger." Start-up costs for resale are high, and companies will only have six to seven hours per day during which to recoup costs, he said. Bottom line: Resellers will have a hard time loading enough traffic on their lines to make money.

However, with ACC and Alanna already lined up to take a crack at the market, Langner predicted that resale would have a significant impact on the market. For example, AT&T and other providers will be able to bypass accounting relationships to buy private-line capacity outside the accounting rate mechanism and then resell it via VPNs.

Big companies with custom contracts will insist on AT&T passing the savings gained from switching traffic to private lines on to them, Langner said. Similar effects should show up in the 1+ and 800 markets, he said.

International accounting rates themselves may be slow to fall in order to compete with resellers' pricing. The rates must be negotiated between carriers, typically a slow-moving process. Also, large carriers have benefitted from the high-profit margins on international calls and may not be eager to rework accounting rates until pressured by resellers.

Ethernet. By

$50 per port.
(8 users, unmanaged)

$55 per port.
(16 users, unmanaged)

$72 per port.
(32 users, managed)

$66 per port.
(48 users, managed)

© 1994 SynOptics Communications, Inc. SynOptics is a registered trademark and Lattis EZ-View is a trademark of SynOptics Communications, Inc. All prices are manufacturer's suggested retail prices.

Count me in.

I'd like to learn more about SynOptics low-priced hubs. Please send more information—including a Lattis EZ-View demo disk.

Name _____

Title _____

Company/Organization _____

Address _____

City/State/Zip _____ Telephone _____

FAX Number _____

Internet Address _____

SynOptics

MA9410A-NW

SYN4165-NW

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 150 JACKSONVILLE, FL

POSTAGE WILL BE PAID BY ADDRESSEE

SynOptics

SynOptics Communications, Inc.
P.O. Box 45018
Jacksonville, FL 32232-9968

MOBILE COMMUNICATIONS

Wireless PBXs pick up steam as NEC, Uniden enter the market

BY JOANIE WEXLER

San Diego

Users who can't afford to miss a phone call are starting to see wireless PBX options emerge from switch makers and other telecommunications equipment vendors.

Private branch exchange maker NEC America, Inc. and wireless equipment company Uniden America Corp., for instance, announced wireless PBX products at the Tele-Communications Association '94 (TCA) show here earlier this month. A few weeks prior, AT&T began shipping wireless systems for its Definity PBX and smaller phone systems.

The products allow telephone switches to recognize a wireless flavor of users' telephone extensions so incoming calls can buzz workers who are away from their desks — a natural technology match to users' increasing trend toward mobility and corporations' concern for productivity.

AT&T said its system stretches phone users' mobility to a radius wider than a city block. The Uniden gear, which is being developed to work with several manufacturers' PBXs, allows incoming calls to be redirected to a roaming worker more than a mile away from the switch in an open environment, said Tony Mirabelli, vice president of marketing at Fort Worth, Texas-based Uniden. He acknowledged that the range is much less in buildings with walls and other interference.

Siemens Rolm Communications, Inc. began shipping a wireless adjunct to its PBX family last year, and Northern Telecom, Inc. (NTI) has gear available outside the U.S., which it plans to ship in this country during the second quarter of next year (see graphic).

"Today, wireless PBX systems are being implemented by early adopters with a compelling need to pay the high cost," such as those concerned with missing a big sale, said Dan Merriman, director of mobile and wireless communications at BIS Strategic Decisions, a consulting firm based in Norwell, Mass.

Walk and work

PBX vendors are giving users room to roam by cutting them free from phone cords.

Vendor Product	Availability	Price per user
AT&T		
• AT&T Digital Business Cordless	Now	$595
• TransTalk 9000 Digital Wireless System		$795
NEC America		
• NEAX2400 Wireless Communications System	1Q 1995	Analog version: About $800** Digital version: $1,800-$2,000
Northern Telecom		
• Meridian Companion	2Q 1995*	Unannounced
• Companion Adjunct System**		
• Norstar Companion		
Siemens Rolm		
• ROLMphone 900	Now	$1,500 and up
Uniden		
• PH9000 (analog)**	January 1995	$400-$450
• EXP9500 (digital)**		$700-$800

* Planned U.S. rollout; available now in Europe, Asia and Canada.
**Works with multiple vendors' PBXs.

The cost to extend PBXs wirelessly ranges anywhere from $400 to $2,000 per user, depending on whether the extension is analog or digital, as well as which vendor's switch the customer is using.

The cost factor will probably inhibit many customers from wirelessly enabling local phone users enmasse right away.

"It would be a real productivity booster for some of our executives who roam our malls, but it won't happen for everyone for a while," said Barbara Conroy, telecommunications supervisor at The Rouse Co., a Columbia, Md., developer and manager of shopping plazas, office buildings and other properties.

Most vendors have taken to providing at least two flavors of wireless telephones. The less expensive version is an analog handset that forwards calls to wandering workers but does not support many digital PBX features, such as caller identification and multiple lines.

The higher priced version is a proprietary digital PBX adjunct that allows the phone in the user's pocket to perform as it would on the desktop.

At this juncture, Uniden's EXP9500 and AT&T's TransTalk digital products are the price winners at $700 to $800 per user. The first switches with which the Uniden digital products will be compatible will be NTI PBXs in the first quarter of next year, Mirabelli said, which will beat NTI's own entry to the U.S. market.

Robert Talty, NEC's director of marketing, said his company is working with Uniden for a digital adjunct, which would be an alternative to NEC's NEAX2400 Wireless Communications System (WCS).

The NEAX2400 WCS, announced at the TCA show, can be configured as an integrated system with the NEAX2400 or as an analog adjunct that will also work with other vendors' PBXs.

Talty said NEC is also working on a PBX adjunct that would allow a wireless voice/data personal communicator to link to its switch. That move speaks to the likelihood of mobile voice and data technologies blending in the future, Merriman said.

While BIS sees significant potential for in-building communications on the voice and data side, Merriman said a driver for wireless PBX success will be developing standards so a digital phone can be used in multiple switch environments. That would allow manufacturers to realize economies of scale and, ultimately, lower the per-user cost, he said.

Comments?

See "How to reach us" on the back page.

the numbers.

$64 per port.
(64 users, managed)

$62 per port.
(80 users, managed)

When it comes to your Ethernet workgroup needs, no one makes it all add up like SynOptics.® Especially when you can get SynOptics quality at prices that start as low as $50 per port.

NOW EZ-View $99

Take your pick from our complete line of affordable 8- and 16-port hubs. Both lines are available managed or unmanaged, depending upon your needs and budget.

And when you consider scalability, only SynOptics offers three levels of network management, including SNMP, RMON and probe technologies. Plus, for a limited time you can get started with SNMP-compliant EZ-View™ software for just $99.

1-800-PRO-NTWK
EXTENSION 403

yes It runs with NetWare

For more information on SynOptics stackable hubs, and an EZ-View demo disk, call 1-800-PRO-NTWK, ext. 403. It's the only number you really need to know.

SynOptics
Building the Network Fabric

RATE & TARIFF MONITOR

by Eric Paulak

The local calling area just got bigger

As the intra-LATA markets are opening up in the states, most local exchange carriers are reacting by dropping their intra-LATA toll rates, resulting in rate wars with the long-distance carriers.

That's what happened recently in New Jersey with Bell Atlantic Corp., and it's gearing up in California with Pacific Bell.

But it's a different story in little ol' South Carolina.

BellSouth Corp. has decided the best way to deal with intra-LATA long-distance competition is to just make every call within a LATA a local call.

That could mean huge savings if you make a lot of intra-LATA toll calls in the state. But if you make many local calls, you could end up paying a lot more. Here's how it works.

Previously, just to get a PBX trunk line for measured service in South Carolina, BellSouth charged $37.98 per month. Local calls cost 5 cents for the first minute and 1 cent per minute thereafter. Extended local calls — those to some suburban areas around the cities — cost 8 cents for the first minute and 3 cents per minute thereafter. And BellSouth's intra-LATA toll calls cost 24 cents to 56 cents for the first minute and 13 cents to 39 cents per minute thereafter, depending on the distance of the call.

Now with BellSouth's Area Plus service, a PBX trunk line costs $49.50 per month; local calls are priced at 2 cents per minute, and intra-LATA toll calls are 12 cents per minute for the first and each subsequent minute.

How's this compare to AT&T? For intrastate, intra-LATA toll calls, AT&T charges 23 to 32 cents for the first minute and 13 to 31.8 cents for every whole or partial minute thereafter. These rates are comparable to BellSouth's traditional intra-LATA toll rates, but they're nowhere near the rates you can get under Area Plus.

So if you make a lot of long-distance calls from one end of any of the six LATAs in South Carolina to the other end of the same LATA, BellSouth's new Area Plus service is definitely a better deal for you. For example, a 20-minute, 100-mile call that used to cost $7.17 now costs $2.40 under the Area Plus plan.

But if you make a lot of long-duration local calls, Area Plus will actually increase your phone bill. For example, under the old measured service plan, a 20-minute local call with the best rates would cost 24 cents. The same call under Area Plus now costs 40 cents.

In this case, you would be better off switching to BellSouth's flat-rate service, which costs $68.10 to $88.50 per PBX trunk line, to get unlimited monthly local calling. The trade-off is that you are then stuck with the higher measured rates for intra-LATA toll calls.

For the most part, however, as long as your local calls don't make up more than two-thirds of your phone bill, you should be better off with Area Plus.

If don't do business in South Carolina, stay tuned. BellSouth will probably try this ploy in the rest of its nine-state region.

And if it catches on in BellSouth's region, you may see local calling areas growing in other Bell regions, as well.

The Colorado Public Utility Commission, for example, just adopted rules that will expand its local calling areas based on the amount of traffic that flows from one area to another. If two communities meet certain traffic requirements, they'll merge into a local calling area or an extended local calling area.

Why is this happening? Federal government inaction on telecommunications reform has prompted many state regulators to come up with their own reform measures. And going with larger local calling areas cuts rates quicker than what standard intra-LATA competition is accomplishing.

The downside is that leaves the Bell companies in a more secure local monopoly. Most businesses, however, push aside this concern when they see their savings.

Paulak is associate publisher for the Center for Communications Management Information in Rockville, Md., a provider of rate and tariff information. He can be reached at (301) 816-8950, Ext. 327.

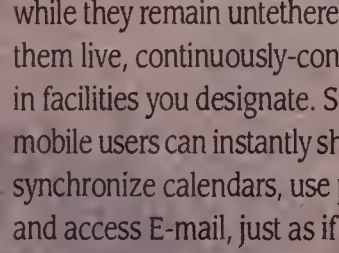
GIVE MOBILE USERS THIS WIRELESS LAN SOLUTION AND THEY'LL MAKE THE CONNECTION INSTANTLY.

Photonics COLLABORATIVE is the most reliable and cost-effective in-building wireless network solution available.

With it, you can effortlessly, transparently, connect on-campus mobile computer users to network resources, all while they remain untethered. COLLABORATIVE will provide them live, continuously-connected roaming in facilities you designate. So your mobile users can instantly share files, synchronize calendars, use printers and access E-mail, just as if they were cabled directly to your LAN.

COLLABORATIVE also enables users to create their own full-featured, peer-to-peer LANs, usable on-campus or at any remote site. It's just what's needed for ad hoc work groups, for temporary networks anywhere. Perfect for use in conferences, meeting rooms, shared offices, classrooms and portable training areas.

COLLABORATIVE is ideal for granting guest access to your network for consultants, visiting staffers and other intermittent users, too, without the problems of disrupting your LAN. And you can use it to create or extend networks where hard-wiring would be difficult, costly, or impossible.



(actual size)

Photonics' technology uses diffuse infrared light that bounces off walls, ceilings, furniture and floors. The signal is virtually impossible to block within a room, making the network connection very reliable. The connection is also very secure—it won't penetrate walls—unless you specifically bridge it to your wiring.

COLLABORATIVE is incredibly power-efficient, for true portability. Setup can be done in minutes. It works with all major networking software. It's a world-ready solution, free from FCC and other governmental restrictions, globally.

And Collaborative is backed by a three year warranty and a 30-day money back guarantee.

Call today, toll-free, 1-800-628-3033*, or fax us at 408-955-7950. Get your free copy of the *"Overview of Wireless LAN Technology"* white paper and detailed product specifications. Mention this ad and get a special savings offer on Starter Kits!

Get Photonics. It's the wireless LAN solution to getting your mobile computer users connected, instantly.

PHOTONICS™

Instant Wireless Networking

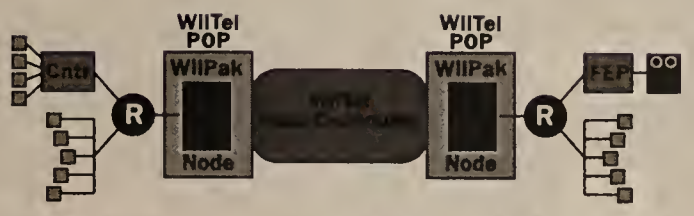
CALL 1-800-628-3033* NOW FOR YOUR SPECIAL STARTER KIT OFFER.

*Outside continental United States, call 408-955-7930, ext. 240

Distributed by: USA–Ingram Micro, UK–Gomark Ltd., ITALY–Elcom and Delta SRL, FRANCE–TCI, GERMANY–HSD GmbH, SWITZERLAND–Wireless Trading AG, AUSTRALIA–I World Systems Pty Ltd., JAPAN–NTT–IT

©1994 Photonics Corporation 2940 North First Street, San Jose, CA 95134. COLLABORATIVE and the Photonics logo are trademarks of Photonics Corporation. Other brand and product names are trademarks of their respective holders.

• TOTAL OUTSOURCING • FRAME RELAY SERVICE • LAN-TO-WAN INTEGRATION • PBX EQUIPMENT • VOICE PROCESSING SYSTEMS • VIDEOCONFERENCING • COLLOCATION SERVICES • RERIT CARD • ACCESS ARRANGEMENTS • 1+ SERVICE • MESSAGING • 800 SERVICE • TRAVEL CARD • BANDWIDTH-ON-COMMAND • TELEVISION TRANSMISSION • LAN-WAN NETWORK CONFIGURATIONS • KEY SYSTEMS • CUSTOM ANALYSIS AND TROUBLESHOOTING • BROADCAST-QUALITY TELEVISION TRANSMISSION • BANDWIDTH-ON-COMMAND • TRAVEL CARD • 800 SERVICE • MESSAGING • NETWORK MANAGEMENT SYSTEMS • PRIVATE LINES • LAN-WAN NETWORK CONFIGURATIONS • DATA COMMUNICATIONS EQUIPMENT • KEY SYSTEMS • CUSTOM ANALYSIS AND TROUBLESHOOTING • BROADCAST-QUALITY TELEVISION TRANSMISSION • BANDWIDTH-ON-COMMAND • TRAVEL CARD • 800 SERVICE • MESSAGING •



WilTel's WilPak accommodates business applications such as document sharing, sales and order entry, customer service, traffic aggregation, E-Mail, file transfer and payroll and accounting.

Relax, WilTel Can Consolidate And Integrate Your Company's LAN And SNA Networks.

Ugh. You've got one tough job. But we can make it easier. Just remember, WilTel® is the leader in business data networking services.

WilTel introduced the first frame relay transmission service: WilPak™. And no one knows more about consolidating your LAN and SNA networks to simplify network architecture and save money. Only WilTel. Only WilPak.

As the frame relay leaders, WilTel continues to introduce cutting-edge innovations. For instance, now you can set maximum sustained transmission rates on each PVC, to accommodate business applications requiring a high degree of predictability and reliability. That means your virtual network can function like a dedicated network. What's more, WilTel's your one-stop shop for your frame relay needs – coast-to-coast *and* internationally. Including transmission, premises equipment, internet access and ongoing maintenance.

Call 1-800-364-5113 for your free "WilPak" tutorial diskette.

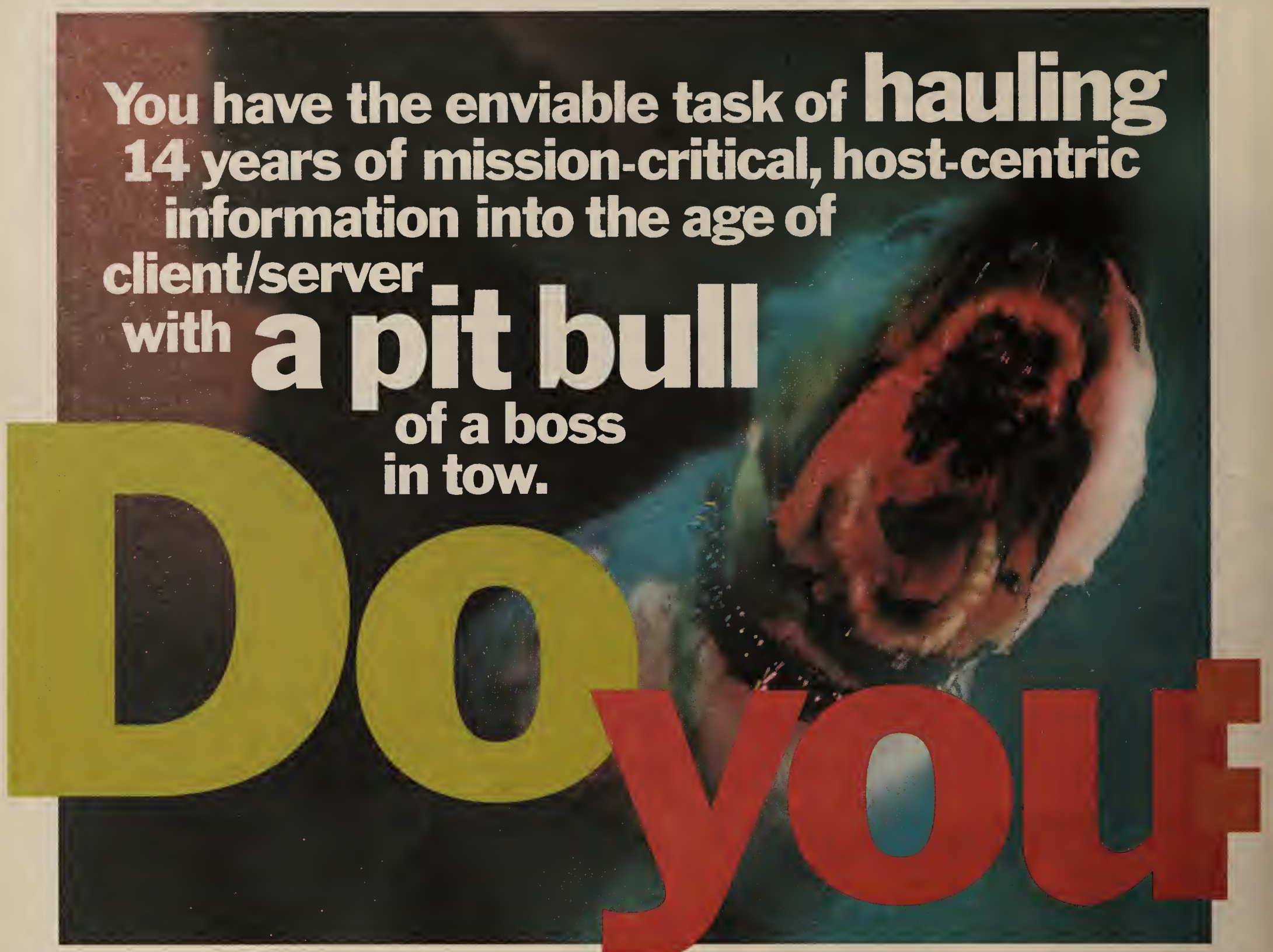
If you've got the weight of your company on your shoulders, call WilTel. We'll not only deliver custom-tailored frame relay packages, but private-line and switched services solutions, too. From a nationwide network to premises equipment. Just take aim at WilTel, the great telecommunications pain reliever.

LIKE LIFE ISN'T PAINFUL ENOUGH, THEN YOU'RE APPOINTED MIS DIRECTOR.

WILTEL
TURNS UP TECHNOLOGY
1-800-364-5113
Tulsa, Oklahoma
info@wiltel.com

©1994 WilTel

You have the enviable task of hauling 14 years of mission-critical, host-centric information into the age of client/server with a pit bull of a boss in tow.



Do you?

A
Consider a career in the wonderful world of fast food.

B
Change all your desktops to one operating system. (Yeah, right.)

C
Ask your boss for a zillion dollar budget. (Sure, ask for a fat raise while you're at it.)

D
Get Irma software and its career-saving tools.

Irma™ host access software is the smart choice for corporate developers who want to get the most out of their people and their business processes. Smart because it can seamlessly integrate legacy information on host systems into your new and ever-growing client/server applications. All of which, we might add, is possible through the power of QuickApp™ and other invaluable Irma development and productivity tools. Tools that can cut client/server development time in half, navigate host applications and filet time-intensive functions with a click of a mouse. Irma software also means flexibility, in that it can simultaneously access IBM® Mainframe, AS/400®, UNIX®, DEC® and HP® systems from Windows™, as well as Macs™ without a single hitch. Installation and configuration aren't mental gymnastics, either. And Irma's intuitive file transfer function makes life easier in more than one way. Now that you know the answers to the client/server test, it's time to meet the teacher. (Unless, of course, you prefer taking on pit bulls.)

FOR MORE INFORMATION ON **IRMA** CALL 800.348.3221 X 72R

DCA

© 1994 Digital Communications Associates, Inc. All rights reserved. DCA is registered and Irma and QuickApp are trademarked by Digital Communications Associates, Inc. Windows is trademarked by Microsoft Corporation. All other trademarks are the property of their owners.

Outside the U.S., call 404.475.8380

TCP/IP tools get Pipeline to the Internet

BY ADAM GAFFIN

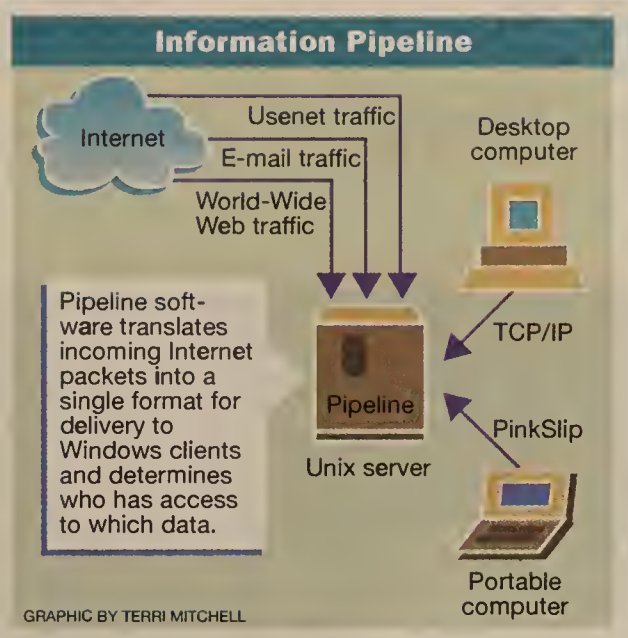
Herndon, Va.

InterCon Systems Corp. this month will add software, dubbed Pipeline, to its existing line of TCP/IP connectivity tools to give users a common graphical interface to a variety of Internet tools and resources.

Although the software can be used to provide a graphical interface to the Internet itself, InterCon President Kurt Baumann said his company's goal is to give users a new way to leverage existing TCP/IP networks for presenting and organizing internal documents and files.

For example, a firm could build its own World-Wide Web (WWW) server to give employees on-line access to corporate policies and product data, he said.

Pipeline, a client/server package, was developed by Internet access provider Pipeline Co, in New York.



GRAPHIC BY TERRI MITCHELL

The Pipeline software includes a Unix-based server component and Windows and Macintosh clients. The server software sits atop existing TCP/IP protocols — for example, the Network News Transfer Protocol for Usenet conferences and the Simple Mail Transfer Protocol for electronic mail. It converts

See **Pipeline**, *page 45*

Lotus bolsters its imaging integration

BY KEVIN FOGARTY AND ADAM GAFFIN

Cambridge, Mass.

Lotus Development Corp. last week rolled out a new version of its Notes-based imaging software that adds the ability to integrate with heavy-duty workflow systems.

LN:DI enhancements

- **Tool kit for integrating LN:DI with other imaging systems.**
- **Access to image store via TCP/IP and IPX/SPX.**
- **Windows-based optical character recognition.**

Lotus Notes: Document Imaging (LN:DI) 2.5, which includes both client and server components, adds a new suite of tools, collectively called the Image Processing Server.

These tools let developers add Notes users to existing image-based workflow systems from FileNet Corp., IBM, ViewStar Corp. and Wang Laboratories, Inc.

LN:DI 2.5's goal is to give users of these workflow systems more flexibility, according to John Caffrey, senior product manager for Notes imaging products at Lotus. For example, the new software would give clerks who process insurance forms a way to route forms to a manager outside the structured preset workflow model, he said.

The tool kit gives developers several options for routing images outside an established workflow model. For example, a copy of an image could be sent over a network to LN:DI's Mass Storage System, where it could then be quickly accessed by Notes users.

The software also adds a new optical character recognition (OCR) application that can run on

See **Lotus**, *page 48*

BRIEFS

PeopleSoft, Inc. will announce this week versions of its **financial and human resources applications** that work with databases from Informix Software, Inc. PeopleSoft Financials 3.0 for the Informix-OnLine Dynamic Server will be available by year end, the firms said. PeopleSoft HRMS 4.0 will be available for Informix databases in the first quarter of 1995. Meanwhile, the company last week announced that it has worked with Unisys Corp. to port its Financials and HRMS software to Unisys' U 6000 symmetric multiprocessor servers running Oracle Corp. databases. This is available now.

Pricing for both Informix and U 6000 versions starts at $100,000 per server.

PeopleSoft: (510) 946-9460.

Siren Software of Palo Alto, Calif., this week will launch an enhanced standards-based electronic mail system for **enterprise messaging.** The Siren Messaging Environment is based on several Internet-related protocols, including the Simple Mail Transfer Protocol and the Multi-purpose Internet Mail Extensions. The system integrates inbound and outbound faxing and re lies on Siren's existing Siren Mail client software.

Siren Mail clients are currently available for Unix, while Windows and Macintosh support will be available by year end. It supports HP-UX, AIX, SunOS and Solaris servers. A Windows NT server is scheduled for early December. Pricing starts at $295 per user.

Siren: (800) 457-4736.

Lotus Development Corp. of Cambridge, Mass., has announced an enhanced **Simple Mail Transfer Protocol** gateway for OS/2 that addresses bugs from earlier versions. The gateway is priced starting at $2,500.

Lotus: (800) 346-1305.

Beta users give Oracle Documents high marks

Text retrieval on the list of favorite features.

BY BARB COLE

Redwood Shores, Calif.

Companies testing beta copies of Oracle Corp.'s Documents software said the groupware's ability to handle vast amounts of text, SQL-based and multimedia data is helping them build new applications accessible by large groups of disparate users.

BETA INSIGHTS

Documents, Oracle's client/server-based groupware system, was announced last month and should be available by the first quarter of 1995.

It is designed to manage assorted data types and will feature links to Oracle's databases and Media Server multimedia system. It will also link with Lotus Development Corp.'s Notes databases.

R.R. Donnelley & Sons, a commercial printing company in Chicago, is building a system called PowerBase based on Oracle Documents.

PowerBase is designed to let customers submit electronic documents for publication in print, CD-ROM, fax and on-line formats.

COMMON GOOD

According to Donna Kmetz, product manager at R.R. Donnelley's database technology services in Waltham, Mass., Oracle Documents provides "one common database driving an assortment of data."

Documents' strengths are that it handles multiple data formats, offers good performance, and has the security and database management capabilities of the Oracle7 database, she said.

Her team has had some difficulty writing a front-end for PowerBase, but Kmetz said she cannot determine if it was a glitch in the Documents application programming interface or the front-end tool she used.

"We're using [Powersoft Corp.'s] PowerBuilder to construct the front end, and getting the products to work together has been a challenge," Kmetz said.

Oracle said users will be able to build applications for Documents using Oracle's Cooperative Development Environment, Oracle Media Objects and third-party tools. Kmetz said Oracle's plans to deliver workflow applications for Documents should ease application development.

Les Briney, executive director of technology at Prodigy Services Company, Inc. in White Plains, N.Y., is another early adopter of Documents. He was drawn to the product for its ability to offer quick retrieval of large amounts of text data.

Prodigy, an on-line service, is using Documents to archive several newspapers on a central server that will be made available on-line to thousands of subscribers.

"We chose Documents because we wanted to use the latest and greatest text search algorithms," Briney said.

Oracle TextServer, a component of Documents, analyzes data and automatically sets up indexes based on themes, as opposed to key words. Users may query the TextServer using these themes or natural language phrases, which gives them more accurate searches, he said.

Donald Brett, chief information officer at Detroit Edison, said about 900 users at the utility are exploiting Documents' electronic mail features.

"We do a lot of attaching and mailing of [Microsoft Corp.'s] Word, Excel and PowerPoint documents," Brett said. Frequently, these documents are passed among multiple users, he said.

Brett said users are able to check one anothers' schedules with the calendar feature of Documents.

"If I need to meet with three people, I just check their calendars before trying to set anything up," he said.

The advanced groupware features of Documents, like the ability to share multimedia information and connect to E-mail systems outside the enterprise, haven't appeared in beta versions yet.

Reality Check

Product: Oracle Documents
Company: Oracle Corp.

The benefits:

- Text search engine lets users perform natural language queries, which result in accurate searches.
- Supports the use of a common database for text, multimedia and other information.

The drawbacks:

- Lacks seamless integration with third-party development tools such as Powersoft Corp.'s PowerBuilder.
- Can be slow without performance tuning.

The user view:

"There are other products that do everything that Documents does. What sets it apart is the [Oracle TextServer] search engine. It analyzes your data and comes up with the appropriate indexes."

Les Briney

U S WEST is helping Hewlett-Packard employees to once again work from home.

The first home of Hewlett-Packard was actually at a home — inside Dave Packard's garage, 1939.

Thanks to U S WEST® Frame Relay Service, a growing number of Hewlett-Packard's Corvallis, Oregon, workforce is now working from home. They are transparently linked to their main office with all of the same applications they use on site. So planners and engineers are enjoying the benefits of working without distraction. And many critical time-to-market schedules are being surpassed. All of which means a more productive and efficient Hewlett-Packard.

To learn more about how your organization can benefit from U S WEST® voice and data communications solutions, call 1-800-562-4154, Ext. 5625. We'll send our new kit on Network Solutions for the 21st Century, including a brochure with CD or diskette.

U S WEST® COMMUNICATIONS

©1994 U S WEST Communications Services, Inc.

APPLICATION SOFTWARE

IBM teams with Aurum on sales force automation apps

BY ADAM GAFFIN

Santa Clara, Calif.

IBM last week announced a technology and marketing deal with Aurum Software, Inc. to roll out a line of client/server-based sales force automation applications.

Aurum's SalesTrak software, aimed at connecting mobile sales workers with one another and their home offices, will become the heart of the IBM Sales Transformation group's offerings to high-end customers.

SalesTrak integrates back-end relational databases with a variety of client-based sales management tools.

First fruits of the new union should come by mid-November, when Aurum rolls out SalesTrak 5.1, based in part on work done with IBM. The new version will include a simpler user interface and will be built atop Gupta Corp.'s SQLWindows and QuickObjects application tools.

It will also incorporate a new C++ class library aimed at easing development of applications linking end users to Oracle Corp. and Sybase, Inc. databases.

A key component of SalesTrak is its capability for data synchronization, which lets mobile users quickly exchange information with relational databases. This, coupled with Aurum's focus on an open, object-oriented application development tool set, were key reasons why IBM decided to partner with Aurum.

As laptop computers become more powerful, users are increasingly demanding the ability to grab information that can help them make decisions, rather than simply being able to upload expense reports to a corporate database, said Phillip Nakata, chief technology officer for IBM's Sales Transformation group. This includes being able to access a variety of corporate databases, he said.

SalesTrak also integrates with Aurum's help desk, telemarketing and quality-control software, which he said helps lead to team efforts in generating sales.

IBM has also been planning its own sales force automation software, though the company did not plan to roll anything out for at least two years.

Hugh Bishop, senior analyst at Aberdeen Group, Inc., a Boston consulting firm, said IBM's decision to work with Aurum — which he described as a leader in its field — makes sense. Sales force automation is proving increasingly important as companies thin out sales forces and try to beat out the competition, he said.

SalesTrak runs on Windows clients and Unix servers. Pricing starts at $1,595 per user.

✆Aurum: (408) 986-8100.

Pipeline

Continued from page 43

TCP/IP packets into a common, proprietary graphical user interface-based protocol for delivery to clients.

ADDITIONAL FEATURES

Pipeline also features a proprietary communications protocol, dubbed PinkSlip, originally designed for use over dial-up phone lines. It is being adapted to run over TCP/IP to let companies deploy the software across existing TCP/IP LANs or WANs.

PinkSlip allows for multitasking — a user can read mail while downloading a large file. Because the protocol incorporates data compression, it is particularly useful for mobile users, as well, Baumann said.

Unlike TCP/IP-based products from such vendors as NetManage, Inc. and FTP Software, Inc., Pipeline presents all information sources in a single menu, Baumann said. This means users no longer have to learn how to navigate Internet services with multiple tools, such as Gopher, he said.

Pipeline also features some management capabilities. The server software lets network managers determine who has access to which functions and applications.

Thanks to the common client interface to Internet tools, the Pipeline-TCP/IP combination could make it easier for companies to leverage TCP/IP nets and tools for collaborative computing across an enterprise, said Richard Villars, director of network architectures and management at market research firm International Data Corp. in Framingham, Mass. A key issue will be ease of administration — such as how easy it is to add users to permission lists for various services, he added.

Pricing starts at $7,500 per server. Client licenses start at $50 per year.

✆InterCon: (703) 709-5500.

Want Your Network To Work Harder? Feed It Better.

Your existing fiber-optic or copper backbone can easily carry heavy loads of voice, video, and data to sites throughout your enterprise. All it takes is a Magnum100™ Transparent Network Transport (TNT) system to multiply its capacity, speed, and stamina.

Magnum100 simply connects each of your voice, video, and data systems to identical systems at your remote sites – transporting everything from T-1/E-1 to Token Ring to compressed video over a *single* fiber or copper backbone. All your LANs. Your phone system. Even your security cameras and video conferencing system. Up to 100 Mbit/sec of bandwidth to allocate as you choose. And Magnum100 is so fault-tolerant, it's already at work in the mission-critical systems of hospitals, airports, school districts, and utilities and telephone companies worldwide.

Magnum100 is the simplest, quickest, and most cost-effective way to add multi-protocol muscle to your backbone. For a healthy serving of information, call today for a free demo disk!

CALL TODAY
1-800-FIBERMUX

ADC Fibermux

ISO 9001 CERTIFIED

ADC Europe NV 32-2-721-5652 • ADC Fibermux, Asia, Pacific 65-227-5621

© 1994. Fibermux Corporation, 21415 Plummer Street, Chatsworth, CA 91311. Fibermux and Magnum100 are trademarks of Fibermux Corporation.

The kind of growth path you'll be on with our new PowerPC SMP servers.

Future PowerPC 604 processor upgrade at no charge

Binary-compatible members of the IBM RISC System/6000® family, extending to the Scalable POWERparallel™ SP2

There *is* a difference.

Actually, "growth Autobahn" may be a more precise description of the first of a new generation of servers that run AIX®, IBM's version of the UNIX® operating system. These servers bring mainframe-level reliability to open computing, putting you on a growth path that's virtually infinite.

At their core is IBM's symmetric multiprocessing (SMP) architecture, harnessed to the PowerPC™ processor. With SMP, you can add PowerPC CPUs as your needs grow, starting with two and expanding up to eight. You can even upgrade to higher-performing PowerPC chips in the future.

Our SMP isn't just built for growth. It's also built for speed.

Unlike in other servers, memory access bottlenecks have been minimized. Each microprocessor can access memory concurrently without waiting. That's supercomputer-level capability.

Our servers also deliver reliability others don't. (That's part of our obsession with guarding your business-critical data.) With IBM SystemGuard™, an independent service processor automatically brings you back online if processor, memory, software, disk errors or power failures occur.

All these mainframe capabilities come in machines that run AIX. So networks can run everything from engineering and accounting applications to databases such as DB2/6000®, INFORMIX®, INGRES™, ORACLE®, PROGRESS® and SYBASE®.

If this is the path you want to be on, you can get more information through the Internet via IBM's Worldwide Web server at www.ibm.com, or call your IBM representative, IBM Business Partner or 1 800 IBM-6676, ext. 621.

THE NEXT-GENERATION

RISC SYSTEM/6000

SMP SERVERS FROM IBM

RISC System/6000 uniprocessor to SMP upgrades available

6.5% financing through IBM Credit Corp.*

IBM

*Financing will vary based on customer credit rating, financing terms and financing option. 6.5% rate applies to best credit rating, 24-36 month term. Offer applies to systems installed by January 31, 1995. Restrictions may apply. Offer may be withdrawn at any time. IBM, RISC System/6000, AIX and DB2/6000 are registered trademarks and PowerPC, IBM SystemGuard and POWERparallel are trademarks of International Business Machines Corporation. UNIX is a registered trademark in the U.S. and other countries licensed exclusively through the X/Open Company Limited. All other trademarks and registered trademarks are properties of their respective companies. © 1994 IBM Corp.

New apps to ease project coordination

BY KEVIN FOGARTY
AND ADAM GAFFIN

A Micro-Frame Technologies, Inc. product that takes desktop project management to the enterprise was among several project management software announcements made last week.

The firm released ProjectServer 4.0, a client/server application that is designed to link copies of Microsoft Corp. Project 4.0 into a database that tracks the status and resources employed by multiple projects.

The product runs on a server, collecting data from Microsoft Project files and depositing it into a Microsoft or Sybase, Inc. SQL Server database.

It expands the usefulness of Microsoft Project — a desktop product that stores its data in a proprietary database — by making data that had been stored on individual desktops available across the network.

ProjectServer includes applications to track incomplete tasks, follow a series of events within projects, produce reports on several projects and notify users by electronic mail when a task is late.

The product has a list price of $19,500, but through January will cost $14,500 per server and 10 clients. Additional clients cost $199 each.

Project management menu

Company	Product	Price
Micro-Frame	ProjectServer 4.0	$14,500 per server with 10 user licenses
Intersolv	PVCS Production Gateway 2.1	$10,000 per license
	PVCS Version Manager for Windows	$599 per license
Continuus	Continuus 4.0	$4,000 per simultaneous user

All products are available now.

PRODUCT PROJECT MANAGEMENT ROUNDUP

CONTINUUS OPERATION

Separately, Continuus Software Corp., formerly CaseWare, Inc., has announced enhancements to its configuration management and problem-tracking software.

The Irvine, Calif., company said that Continuus 4.0 adds a customizable process model, the ability to synchronize common project data across a network, and a utility for tracking and integrating software and libraries from outside vendors.

The software is available on several Unix platforms.

INTERSOLV

Intersolv last week announced enhancements to its PVCS software configuration management line, which helps coordinate software development projects, among other things.

PVCS Production Gateway 2.1 adds a capability for testing software being developed at remote sites as well as automatic generation of status reports. The software is designed to ensure synchronization of objects being used to build both mainframe and client/server applications.

The software comes in Windows and OS/2 client versions.

Separately, Intersolv an-nounced the addition of Visual Basic support to its PVCS Version Manager for Windows software. The enhancement means that Visual Basic programmers can now develop applications in teams across a network, using PVCS' various team-development tools, such as version management and problem tracking.

✆Micro-Frame: (909) 983-2711; Continuus: (800) 820-1995; Intersolv: (301) 230-3200.

Business Objects allies with data warehouse vendor pair

BY BARB COLE
AND KEVIN FOGARTY

Cupertino, Calif.

Data access tool vendor Business Objects, Inc. last week said it will team with two data warehouse vendors to deliver an integrated client/server decision support system and that it is shipping new versions of its data access tool for Macintosh and Unix clients.

Business Objects is integrating its object-oriented database access software — called BusinessObjects — with Red Brick Systems, Inc.'s server-based data warehouse software. It also signed a joint marketing agreement with Prism Solutions, Inc., which makes software to collect data from operational databases and pipe it in to data warehouses.

The agreements will let the three vendors sell a package of applications that can pull data from production databases, massage it, store it in a data warehouse and make it available to end users via an easy-to-use query tool.

BusinessObjects lets users query relational databases by stringing together objects consisting of prewritten SQL components.

Users like how the products interact, but analysts said the agreements don't offer much more than one-stop shopping for data warehouse components.

BusinessObjects can use Red Brick's proprietary SQL dialect to access data but cannot easily access meta data stored in Red Brick Warehouse, said Bobby Cameron, analyst at Forrester Research, Inc. in Cambridge, Mass.

Meta data is information that is stored in data warehouses and provides background on where the transactional data came from and where it can be found. BusinessObjects can be used to import meta data from Red Brick Warehouse, but administrators have to manually update BusinessObjects components to match changes in meta data.

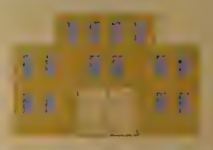
If BusinessObjects were integrated with Red Brick's meta data stores, "then I really would have said 'Wow!'," Cameron said.

Still, the tools work well together for simple queries — even for users with no information systems background, said Eileen McCormack, a data analyst for Kirkland, Wash.-based chemical distribution company Van Waters & Rogers.

Working together

Prism Warehouse Manager
Cleans and extracts data from operational databases and feeds it to a data warehouse.

Red Brick Warehouse
Stores and manipulates data.



BusinessObjects
Helps users easily run queries against a warehouse using Red Brick proprietary SQL dialect.

MAC AND UNIX ADDITIONS

In a separate announcement, Business Objects said it is shipping Macintosh and Unix Motif versions of BusinessObjects.

Previously available only on Windows, the software is designed to let users build reports on one platform and share them with users on other platforms. BusinessObjects can access data stored in several databases including those from Oracle Corp., Sybase, Inc. and Informix Software, Inc.

The software costs $595 per end user module and $3,495 for a manager's module (development kit).

✆Business Objects: (408) 973-9300; Red Brick: (408) 399-3200; Prism: (408) 774-2600.

CONSULTING SERVICES

IBM's Client/Server Computing group strives to be neutral

BY CARA CUNNINGHAM

Paris

Although IBM's Client/Server Computing division preaches a multivendor approach to building enterprise networks, customers might think twice before turning to the company for fear of getting a Big Blue sales pitch.

The services, consulting and integration unit, founded in November of 1992, today boasts world-class expertise in hooking together its own products as well as products from competitors such as Hewlett-Packard Co., Digital Equipment Corp., Oracle Corp. and Microsoft Corp.

But it could take more cajoling to prove that this group is not just out to sell IBM.

"They have an uphill struggle in terms of presenting themselves not as a Trojan horse for what everyone expects, i.e. 'Buy our mainframes,'" said George O'Connor, research manager of large systems with International Data Corp. in London.

"I think they are making a genuine effort to separate [consulting from product sales]. The real question is, can you wash all of that old loyalty out of your mind?" said Ken Dec, research director of IT management with Gartner Group, Inc. in Stamford, Conn. "I give them a B+ for trying. As for how well they're doing, the jury is still out."

"I think they are making a genuine effort to separate [consulting from product sales.] The real question is, can you wash all of that old loyalty out of your mind?"

The IBM group's general manager, Martin Clague, who is based in White Plains, N.Y., acknowledged at a press gathering here that vestiges still remain of IBM's long-standing image as pushing only proprietary products.

Clague emphasized, however, that IBM is not only enhancing its own products to interoperate, but also ensuring that they work with products from competitors and stick to a list of standards.

Clague hires his specialists away from competing companies to ensure current, in-depth knowledge of key products such as Oracle's databases and SAP AG's integrated business software, he said.

One customer, who approached the group to connect a central IBM mainframe with minicomputers from various vendors, was impressed with the knowledge these specialists offered in competing products and plans to use this group more in the future.

"We are confident they won't stick to the IBM hardware and software — they will propose the solution they think is right," said Daryl Hayes, information systems manager with Alco Capital Resource, Inc., the leasing branch of an office products dealership in Macon, Ga. "They know the only way we'll keep coming back is with good advice."

Lotus

Continued from page 43

a client rather than on a Notes server.

The change has meant significant reductions in server load at Aide, Inc. in Greenville, S.C., according to Neil Whitman, vice president of the contract engineering company. Previously, the company had scanned in some 15,000 resumes at night when other server demands were low, he said. Now the company can monitor such server processing during the day.

Pricing starts at $495 for Image Processing Server software; $3,000 for the optional Mass Storage System, based on OS/2; $995 for the OCR software; and $99 for LN:DI client software.

WANG WADES IN

Separately, Wang announced Open/image for Lotus' Notes. This is a software bundle that includes an image client- and server-based image viewer and an application development tool kit.

Open/image Navigator, the viewer, will be released next month. It will let users sift through Open/image files, locate and preview images, and convert them to LN:DI format so they can be used in Notes, according to Su Doyle, senior marketing manager for Notes companion products at Wang.

The tool kit, Open/image Gateway, will enable developers to build applications that can manually or automatically export batches of Open/image documents to LN:DI. Open/image Navigator only lets a single user access one document at a time.

The tool kit is due by year end.

Open/image Navigator costs $99 per user; Open/image Gateway costs $2,500 per server.

✆Lotus: (617) 577-8500; Wang: (508)459-5000.

Any T1 CSU/DSU gets you in the ballpark. Only one gets you in the game.

The 3160 from AT&T, of course. It's the only T1 CSU/DSU backed with advanced Bell Labs technology. And one of the few with an SNMP agent built in. So now more than ever, AT&T Paradyne is your ticket to the network. To LAN interconnection. To integrated voice, data and video. To world-class access, quality and service as only AT&T can do it. All at a very affordable price. Why settle for anything less?

Access the Globe.

See the AT&T 3160 in action and get a peek at our HP OpenView Management Application. Call 800 482-3333, extension 608, for a free demo disk today.

AT&T Paradyne

©1994 AT&T.

ADCom
800-238-1094

AmeriNet, Inc.
800-367-7145

Applied Delta Systems, Inc.
800-782-0038

Business Communication Distributor
504-834-8925

Centron DPL Company
800-258-6636

CODARAM Corporation
800-726-0278

COM/PERIPHERALS, INC.
800-989-7911

DATATECH
714-493-2028

Federal Communications Corporation
800-322-0644

FICOMP, Inc.
215-997-2600

FICOMP SYSTEMS, INC.
908-274-2600

Gateway Communications, Inc.
513-489-2600

GREAT LAKES TECHNOLOGIES, INC.
800-654-6662

Gulf Communication Services
305-938-9511

Interlink Communication Systems
800-638-8481

KELLY COMMUNICATIONS SYSTEMS
800-433-1860

LOGOS Communications, Inc.
800-837-7777

Los Altos Networks, Inc.
800-992-8668

MSN COMMUNICATIONS
303-788-0188

NOVA Electronics Data, Inc.
800-925-6682

Primary Telecommunications, Inc.
703-698-8110

Source Inc.
800-647-2205

THOMAS TECHNOLOGIES, LIMITED
800-848-2835

EDITORIAL

Who needs LAN-based video?

For as long as I've been on the network beat, videoconferencing has been poised for takeoff.

At first, video was going to replace travel and save companies scads of time and money. It just didn't happen that way. Now, I'm told, LAN-based video will drive the technology across the enterprise. But I don't believe it.

After talking with customers, vendors and others, I'm not convinced we'll be conversing with our colleagues over desktop video connections any time soon. I mean, what's the productivity gain in being able to see a coworker in a scratchy little screen that gets in the way of your other applications? Even vendors are hard-pressed to answer that question.

Application-sharing packages that let employees work together on files, spreadsheets and documents are powerful tools because they fit so neatly with team-based approaches to work. They move us beyond the simple store-and-forward mode to real collaborative work, and they're highly useful in organizations trying to get people in different departments and sites to share ideas.

But what does desktop conferencing add to that? I love my colleagues; their faces are etched in my mind. But I don't need to see them to work with them on an application. That could prove annoying in a point-to-point setup and downright disruptive in multipoint conferencing.

One venture capitalist, with whom I usually agree, tells me LAN video usage will explode like fax and voice messaging as the cost falls. But there's a big difference. Fax and voice messaging are great tools for *avoiding* meetings, which everyone is desperately trying to do. I'm not in the market for a technology — LAN-based video — that requires me to meet more often with people I see all the time.

Cost isn't the main issue anyway, nor is the added strain video will put on LANs. If the applications were there, companies could swing the cost of LAN-based video and they could steel their networks to handle it. But companies are struggling to figure out why they need to give video to employees on a LAN.

Lest I be the target of much vitriol, let me hedge this by narrowing the parameters. Video is a great solution for reaching out to customers or certain types of meetings that really demand face-to-face contact. Video will also play a proud role in multimedia applications. Using video for training or giving people the ability to pull up video clips that help them do their jobs better is wonderful.

Companies will install desktop video in onesies and twosies to give key personnel a way to offer better service to their clients. But widespread use of LAN-based video to support workgroups isn't going to happen.

In the LAN environment, video companies would do well to put the marketing emphasis on their innovative application-sharing technologies and hope that those products can drag video into the workgroup arena.

➸JOHN GALLANT jgallant@world.std.com

TELETOONS

FRANK AND TROISE

MACROSCOPE

by James Kobielus

Interactive TV needs fine-tuning to succeed

Interactive television is one of today's leading magnets for venture capital, corporate alliances and breathless journalistic prose. Users should stay tuned to the developments occurring in the interactive TV market — such as Bell Atlantic Corp.'s and Oracle Corp.'s Stargazer project, a public, interactive multimedia service accessible via a TV set-top box and remote control (*NW*, May 2, page 3) — but try to tune out all the empty punditry and utopian blather surrounding the topic.

Interactive TV will be more than just a souped-up video game medium. It will be one of the primary advertising, marketing, information delivery, education, training and customer service channels in the next century. It will also be the principal means by which commercial and residential users access video-on-demand, hypermedia libraries, electronic mail, collaborative computing, videoconferencing, participative sporting and entertainment events, and other sophisticated net services.

Advertiser support will be as critical to the development of these interactive TV services as it was to the growth of broadcast and cable TV. Companies that are exploring marketing applications on the Internet will eventually migrate to interactive TV due to its greater demographic penetration, superior multimedia and ease of use. In fact, today's text-oriented Internet services will become just additional options in the multichannel interactive TV networks that will be deployed worldwide. A growing number of CATV operators have, in fact, allocated channel slots for Internet services, which users typically will access through separate telephone or radio-frequency connections.

However, don't try to sell your senior executives on interactive TV as a marketing tool until clear standards are established for critical hardware, software, and communications technologies and services. Almost every interactive TV solution on the market today is based on proprietary components that have yet to be submitted for review and standardization by recognized industry councils. Currently, you would reach a much larger piece of your target market via broadcast TV, radio or direct mail.

For interactive TV to flourish, standards are needed to establish an open platform for third-party interactive TV programming suppliers. The open platform regulatory concept, proposed by the Electronic Frontier Foundation and endorsed by the Clinton-Gore administration, would require telephone companies, cable operators and other video dial-tone providers to offer equal, nondiscriminatory access to all programming and data-services suppliers.

This proposal — which might be termed a global "must carry" requirement — will allow you to spread your interactive TV sales pitches to the largest possible customer base since video network operators will be prevented from blocking transmission of your signal to any requesting party. Open platform standards — established, one supposes, by the Federal Communications Commission — will have to address procedures for programming suppliers to interconnect, compensate and resolve problems with carriers that provide access to the final user.

The most critical piece of equipment for interactive TV, the remote control, will have to change radically in architecture and functions to support user-driven multimedia applications. Tomorrow's remote control will be a pen- or voice-driven personal digital assistant (PDA) with infrared links to TVs and other devices. Users will review program listings and make selections on the remote's screen, rather than through prompts and menus flashing on the TV screen.

It will be necessary to establish over-the-air signaling standards between remote controls and electronic devices, so that any remote control can work with any TV without having to input special programming codes. It will also be necessary to establish standard application program interfaces (API) between remote control PDAs and interactive TV systems. Standard TV-enabling APIs will almost certainly produce a brisk mass market for PDA client applications supporting smart channel-surfing agents, TV directory lookup, VCR programming and other value-added services. You will be able to cement the bond with new and existing customers by providing them with PDAs that facilitate ordering, payment, delivery, and consumption of your products and services via interactive TV.

Like remote controls, TV sets also will have to be redesigned to support interactive services. They will have to become all-purpose multimedia computers, equipped with system buses capable of managing multiple, continuous streams of video, audio, graphics, animation and other traffic. These buses will have to support standard peripheral interfaces, similar in concept to the widely accepted PCMCIA standard for peripheral interconnection to portable computers.

The most important peripheral will be the so-called set-top box, or controller device, which, belying its name, will almost certainly be firmware that is inserted into, rather than placed on top of, an interactive TV. Other peripherals that will interface with the system bus of the typical interactive TV will include VCRs, videocameras, color scanners, color printers, optical storage devices, video game controllers and virtual reality gear. You will have to design your interactive TV advertising and customer service programs to take advantage of the peripheral devices that customers have attached to their TVs.

Users should have a flexible approach to interactive TV, adopting and adapting new technologies and standards as they are developed. Users can set up a successful interactive TV pilot with today's limited infrastructure, based on using telephone connections, FM subcarriers or some other technology as the return-communications segment.

Don't hesitate to evaluate interactive TV for advertising, marketing and customer service just because the infrastructure is immature. Pioneering interactive TV marketers will be in a position to dominate their industries soon after the turn of the century, taking the proven concept of home shopping to the next level of usefulness and sophistication.

➸Kobielus, a contributor editor to *NW*, is a senior telecommunications analyst with DynCorp, a Reston, Va.-based systems integration and professional services firm. He can be reached at (703) 461-2367 or via the Internet at kobielj@usva8.dyncorp.com. The opinions expressed are his own.

THE SYNOPTICS/WELLFLEET DEAL

Vendor view by Andy Ludwick

Merger defines future of networking

The SynOptics Communications, Inc./Wellfleet Communications, Inc. merger represents more than just the creation of the world's largest networking company (*NW*, July 11, page 1). In a much larger sense, the merger can be viewed as a defining event in the evolution of an industry that will address users' growing concerns regarding the future of hubs, routers and switches.

Over the past 12 months, SynOptics and Wellfleet reached a common conclusion: Networking is inevitably being driven toward the integration of routing and switching technology. The merger allows both companies to take advantage of this trend by blending their strengths — Wellfleet's routing expertise and SynOptics' advanced switching solutions — into a fundamentally new technology that will define the next generation of networking.

The merger makes sense for a number of reasons. First, it allows us to dedicate a single engineering team to develop this new technology, which will combine routing's connection management capabilities with switching's high-performance throughput. The process will be an ongoing effort, and the merger delivers a stronger, more cohesive team than any strategic alliance or marketing partnership could provide.

Second, the merger enables us to formulate and execute a coherent, long-term strategy that will guide users through the rapidly approaching transition to virtual networking. Unlike independent hub and router vendors, whose isolation prevents them from offering more than a 12- to 18-month glimpse into the future, our new company will benefit from unprecedented cooperation between hub and routing leaders. As a result, we can provide a far-reaching vision that helps customers plot their network evolution well into the next decade.

Third, and perhaps most important, is the issue of timing. Networking today is at a crossroads. As demands begin to exceed capabilities, customers must start making some hard decisions about the future. But first, they need someone to explain what the future holds — and what their options will be.

SynOptics and Wellfleet recognize this need. We understand the direction that networking must take.

This merger provides the vehicle for bringing together the best minds in the industry to define and produce these next-generation solutions — the technology that will bridge the gap between today's capabilities and tomorrow's requirements.

Ultimately, customers will benefit most from this merger. The new net road map will be available within six months, with the first products being released six to 12 months after that. This time line maps well with our customers' stated needs, giving them time to evaluate the plan and prepare a foundation before their existing systems reach the breaking point. The new firm will deliver a comprehensive solution for helping these customers incrementally migrate to the enterprise of the future — at their own pace.

Finally, the merger will provide users with a complete end-to-end support system, delivering a single product source that combines the technical expertise of leading switching and router vendors. Customers will gain a whole new perspective on networking — a vantage point that diminishes the restricted views offered by stand-alone hub and router vendors.

Such a perspective is growing increasingly important. Industry experts agree the SynOptics/Wellfleet merger foreshadows an industry trend. To remain competitive in this rapidly evolving market, vendors will have to combine their strengths — or suffer the consequences. SynOptics and Wellfleet were the first to recognize this fundamental fact and, in the final analysis, our customers will reap the benefits of this strategic maneuver.

Ludwick is president and chief executive officer of SynOptics in Santa Clara, Calif. He can be reached at (408) 933-2400.

User view by Luke McCormack

The key is to make migration painless

My organization's immediate reaction to the July announcement of the SynOptics Communications, Inc./Wellfleet Communications, Inc. merger was one of great concern, as it must have been for many users. We have expended significant resources in engineering and deploying network designs that use SynOptics' 3000 hub line and Cisco Systems, Inc.'s routers. We have always worked closely with these vendors' engineering and development staffs to ensure that their products continue to incorporate capabilities that address new requirements.

Our main concern is the merger's potential impact on SynOptics' 3000 hub. The 3000 relies on the 3800 Multimedia Router hub module, which SynOptics developed with Cisco, to handle routing. The solution's low cost appealed to us, as did the fact that it is a sealed unit — that is, the router module is contained within the hub. In our often remote and hostile environments, like on the northern and southern borders of the country, we prefer to have as few separate components as possible.

Our main concern is the merger's potential impact on SynOptics' 3000 hub.

This solution does have some drawbacks, however. Instead of fusing the router technology to the hub backplane, SynOptics has kept the 3800 module isolated, which has limited its capabilities. As a result, my organization has had to use separate high-speed Cisco routers for our high-volume areas that have complex networking requirements. I had hoped the 3800 would evolve into a more high-end router, but now, due to SynOptics' merger with Wellfleet, that does not seem likely.

I'm confident SynOptics will always stand behind this low-cost routing implementation. But I am concerned that SynOptics is unlikely to continue to enhance the product, based, as it is, on Cisco technology. For my organization, this means that we can either continue to buy the hubs implementing the 3800 module, knowing they have a very low life expectancy, or buy stand-alone Cisco routers, which will cost more but which we can trade in or upgrade later. Our migration to the new era of high-speed hub switching and routing technology would be much less painful if the 3800 were expanded on.

SynOptics & Wellfleet

The merger also means complications for us further down the line, when SynOptics begins introducing Wellfleet routing capabilities into its products. We prefer that all the routers in our network come from the same vendor. Now, we will have to learn about Wellfleet capabilities as well as the Cisco ones we're currently using.

We have always been concerned that the development of a switching hub by two separate companies could prove difficult to accomplish without degrading the internal performance of the hub.

The new hubs, concentrators and switches being developed with ultra high-speed backplanes are very demanding for specific throughput characteristics.

However, there is promise of high technical performance if SynOptics/Wellfleet can provide a hub-based router solution with control of the hub, router hardware, software, configuration and management.

Unfortunately, I don't think we will see any fruit from this merger — particularly a routing solution using Wellfleet technology that's fully integrated into the hub and not an isolated module — for well over a year. Meanwhile, my organization will continue to deploy Cisco routers to bring together LAN traffic and feed it to high-speed concentrators, hubs or switches, including all of our low-cost routing solutions.

To succeed, SynOptics must make it painless for organizations using the 3000 line connected with Cisco routers to migrate to a fully integrated hub. Users simply cannot afford to implement high-speed solutions that discard the large investment many of us have made in other router manufacturer's products or SynOptics' own routing solution, the 3800.

McCormack is branch chief for communications software with the U.S. Customs Service in Washington, D.C. He can be reached via the Internet at mccormack@mccorl96.customs.sprint.com.

Letters have moved this week to page 52.

NETWORK WORLD

Editor in Chief
John Gallant

Executive Editor
John Dix

NEWS
News Editor
Paul Desmond

Associate News Editor
Bob Brown

ENTERPRISE INTERNETS
Jim Duffy - Senior Editor
Phone: (508) 820-7525; Fax: (508) 820-3467

Michael Cooney - Senior Editor
Phone: (703) 830-8138; Fax: (703) 830-7963

Michael Csenger - Senior Writer
Phone: (201) 587-7768; Fax: (201) 587-7769

Ellen Messmer - Sr. Washington Correspondent
Phone: (202) 879-6752; Fax: (202) 347-2365

LOCAL NETWORKS
Skip MacAskill - Senior Editor
Phone: (508) 820-7442; Fax: (508) 820-3467

Peggy Watt - Senior Editor
Phone: (415) 903-9519; Fax: (415) 968-3459

GLOBAL SERVICES
Joanie Wexler - Senior Editor
RAF Coordinator
Phone: (508) 820-7441; Fax: (508) 820-3467

Bill Burch - Senior Writer
Phone: (202) 879-6744; Fax: (202) 347-2365

David Rohde - Sr. Washington Correspondent
Phone: (202) 879-6758; Fax: (202) 347-2365

CLIENT/SERVER APPLICATIONS
Barb Cole - Senior Writer
Phone: (619) 484-4896; Fax: (619) 484-0069

Kevin Fogarty - Senior Writer
Phone: (508) 820-7456; Fax: (508) 820-3467

Adam Gaffin - Senior Writer
Phone: (508) 820-7433; Fax: (508) 820-3467

Managing Editor
Michelle Psyhogeos

ART
Susan Champeny - Design Editor
Susan Slater - Design Editor
Terri Mitchell - Associate Design Editor

COPY DESK
Karen Moltenbrey - Associate Editor
Jodi Cohen - Copy Editor
Amy Koulouris - Copy Editor
Laura Mascharka - Copy Editor

FEATURES
Features Editor
Charles Bruno

Jim Brown - Managing Editor
Phone: (508) 820-7408; Fax: (508) 820-1103

Lee Schlesinger - Test/Reviews Editor
Phone: (508) 820-7416

Barbara Wierzbicki - Buyer's Guide Editor
Phone: (508) 820-7427; Fax: (508) 820-1103

Susan Collins - Associate Features Editor
Phone: (508) 820-7413; Fax: (508) 820-1103

Dana Thorat - Associate Features Editor
Phone: (508) 820-7451; Fax: (508) 820-1103

Cheri Paquet - Assistant Features Editor
Phone: (508) 820-7489; Fax: (508) 820-1103

Contributing Editors
Daniel Briere, David J. Buerger, Mark Gibbs, James Kobielus, Mark A. Miller, Alan Pearce

Buyer's Guide Contributors
Linda Musthaler, Josh Penrod, Joseph Skorupa, **Currid & Co.**; Mark Miller, **DigiNet Corp.**; Mark Gibbs, **Gibbs & Co.**; James Kobielus, **Dyn Network Management, Inc.**; Michael Goulde, David Marshak, Ronnie Marshak, John Rymer, **Seybold Group**; John Morency, **Strategic Networks Consulting, Inc.**; Daniel Briere, Chris Finn, Mark Langner, **TeleChoice, Inc.**; Marc Robins, **Robins Press, Inc.**

Test Alliance Partners
Scott Bradner, Harvard University's Network Device Test Lab; Interdisciplinary Telecommunications Program (ITP), University of Colorado at Boulder; Mark Gibbs, Gibbs & Co.; National Computer Security Association; TeleChoice, Inc.

Teletoons
Phil Frank, Joe Trolse

Assistant to the Editor
Cheryl Crivello

Editorial Assistant
Glenna Fasold

Colin Ungaro - **President/Publisher**
Mary Fanning - **V.P. Finance & Operations**
Nanci Farquharson - **Office Service Manager**

Network World
161 Worcester Road
Framingham, MA 01701
Phone: (508) 875-6400; Fax: (508) 820-3467
MCI Mail - 390-4868
Internet: network@world.std.com.

Washington, D.C. Bureau
National Place
1331 Pennsylvania Ave. NW, Suite 505
Washington, D.C. 20004

Letters

Not a cure-all

I realize that Asynchronous Transfer Mode is a neat new technology that increases network speeds, efficiency and all that other stuff. But I am getting tired of it.

It's like corporate America is the couple in the Visa commercial with the broken-down car; writers everywhere are like the little kid on the hill yelling, "ATM! ATM! ATM fix everything!" and corporate America is supposed to follow, find out who (or what) ATM is, use it and live happily ever after.

Well, cash didn't fix that couple's car, and ATM is not going to fix all the network problems that exist. Yes, it's neat, but I don't expect to do anything with ATM until someone proves to me that it is stable enough to bet my budget on.

Michael Faber
Network analyst
Felpausch Food Centers
Hastings, Mich.

Attitude adjustment

In his recent "Back to Reality" column, David Buerger mentioned that US WEST, Inc.'s expansion into the East may help fix the Bell companies' take-it-or-leave-it attitude (Sept. 26, page 63).

Buerger says he's still waiting for NYNEX Corp. to sell ISDN in New York. Here in Utah, we're still waiting for US WEST to sell any ISDN, too. All we hear is, "Early next year, we will have a pilot program."

US WEST has the take-it-or-leave-it attitude here. Maybe we need NYNEX to invade us.

Brad Davis
Senior developer
Zinc Software, Inc.
Pleasant Grove, Utah

Apple shortchanged

As a computing professional and admitted fanatic of Apple Computer, Inc. technology, I was dismayed at the tone of Linda Musthaler's column "NetWare for PowerPC gives users a choice, but little else" (Sept. 19, page 54) and your giving it this negative headline. I strongly believe that you and Ms. Musthaler are doing your readers a disservice by preemptively pooh-poohing (yet again) unreleased Apple software.

In her column, Ms. Musthaler says that she is not convinced that Apple has done enough to make its servers as reliable as others coming from Compaq Computer Corp., Hewlett-Packard Co., IBM and others. While this statement is debatable, I do not consider it fair to judge a product based on prealpha software releases and existing technology. No, Apple does not currently offer many of the same fault-tolerant capabilities in its WorkGroup Server line, but my experience has shown that such capabilities are available from a number of capable third parties.

Of course, PowerPC-based NetWare won't be all things to all people from Day One, but when has there ever been an initial release of a network operation system that has?

I am also bothered by Ms. Musthaler's statement that NetWare 4.1 on the PowerPC does little to improve the integration of Macintoshes on the network.

One might infer from Ms. Musthaler's article that little is happening on this front. Further study on the issue might surprise Ms. Musthaler and many of your readers on the depth and scope of Macintosh integration with IPX and NetWare Directory Services in NetWare 4.1.

Finally, I am outraged that Ms. Musthaler believes that bringing the look and feel of a Macintosh to a NetWare server would be a nightmare for an administrator. Heaven forbid that managing a server should become easy — or, worse, a task that an an average person could perform.

Maybe corporations, schools and governments won't have to spend piles of money, hold bake sales or spend taxpayer dollars so they can recruit and train Certified NetWare Engineers (or buy Windows NT). Once upon a time, didn't some now-unemployed bozos at IBM ridicule the use of "cute little icons?" Bill Gates didn't.

I'm not saying that Apple is perfect. I do, however, think that the company gets shortchanged more often than it deserves in your publication.

Peter Martin
Systems engineer
First Step Computers
Richmond, Va.

Musthaler's response: My opinion of NetWare 4.1 on an Apple PowerPC server was formed based on the needs of the typical network manager of NetWare-centric networks. It is my belief that these managers already have Intel Corp.-based server platforms and would not benefit from introducing the Apple platform into their environments.

My column does state, however, that I believe the product will be a boon for Apple's intended market: those customers who already have Apple networks.

The point is, an Apple server running NetWare in the midst of a roomful of Intel servers may be more trouble than it's worth. However, a PowerPC-based server running NetWare can be a great improvement over old Apple server technology running AppleShare.

As for the reliability of the Apple servers, I'd feel more comfortable knowing that my server has built-in fault-tolerant features that are found in the current crop of superservers. Yes, Apple has third-party vendors that can provide those features, but in my book, "first party" is better than third party when we are talking about critical reliability features.

Regarding the integration of Macintosh clients on the network: Yes, Apple and Novell are making significant strides in this area.

However, it is not exclusive to the Apple PowerPC servers.

These integration features will be available under other versions of NetWare 4.1, as well. There is no advantage to purchasing your server from Apple to improve desktop Macintosh integration.

Finally, I do not begrudge Apple's user interface on its computers. In fact, I believe it is much better than the alternatives.

However, my concern is for the network manager who ends up with a mixed bag of servers — some from Apple and some from Intel-based sources.

The disparate user interfaces in future versions of NetWare could cause confusion for the person who has to learn multiple means for achieving the same result. It's as if a person has to learn both English and Spanish in order to install software.

My intent was not to belittle the efforts of Apple and Novell to bring the power of NetWare to dedicated Apple customers.

On the contrary, I think it's great. I just don't believe that most NW readers are going to run out and buy this product when it becomes available.

Stop whining, ISVs

Regarding your recent story about independent software vendors (ISV) who complain of Microsoft's ability to remain constantly one-up on them because of the de facto standards creation within Microsoft (Sept. 26, page 1):

Microsoft has used its ownership of the Windows operating environment to thwart competitors for years now. Everyone knows it, everyone complains, yet everyone continues to play Microsoft's game by continuing to write to the Windows application program interfaces (API).

ISVs will never have software applications for Windows on par with Microsoft applications because Microsoft has months to prepare for standards changes within Windows before the ISVs do.

This will always be a barrier to competition with Microsoft within the Windows environment. The Justice Department obviously sees this as OK. So quit complaining. It will never change.

Instead of playing Microsoft's game on their field (with their ball), I suggest ISVs look to writing to alternative APIs, such as OS/2. OS/2 is a more stable platform than Windows and is backed by a vendor that most ISVs will never have to compete with product-wise: IBM.

IBM is also much more responsive to customer needs and has unequaled technical support.

As long as Windows exists, Microsoft will own that market. It's the ISVs' decision to play the API and standards games that exist in the Windows environment. If they don't like it, they should get out.

There are millions of OS/2 users out here who would love to see ISV applications run natively on their desktops. It's your choice, ISVs; stop whining about Microsoft and graduate to OS/2.

Ward Kaatz
Systems consultant
Great Northern Insured Annuity Corp.
Seattle

Data dither

While your publication is part of my required reading, I was shocked to see the way you misused graphics to represent the responses of ISV to Microsoft's power in the development arena (Sept. 26, page 1).

In the two pie charts accompanying the article (page 8), you will note that 43% of the respondents answered Yes to the first question and 32% answered Yes to the second question. And 49% of the respondents answered No to the first question and 43% answered No to the second question.

Yet, in both graphics, the Yes slice of the pie chart is clearly larger than the No slice, when, according the data, the No slice should be larger in both graphics.

In fact, in the first graphic, the 43% Yes group is represented as if to suggest that a majority of the respondents answered Yes when, in fact, a full 49% answered No with 8% Not Sure.

While this may only be an error by your graphic artist, I think it points to an even larger problem with this and other articles you have published using sampled data.

In all three articles about Microsoft, you use information collected by Focus Data, Inc. In each case, the data is collected from a survey of 200 users.

This is not a large enough group of people to produce a significant data sample. For instance, a perfectly random sample of 200 subjects still entails a margin of error of plus or minus 8%, with a confidence level of 95%.

If we look at the two graphics mentioned above, we see that neither graphic presents any significant data. With an 8% margin of error, it is possible that the actual views of the sampled community are the opposite of those shown in the graphics.

In the top pie chart, Yes equals 43%, and No equals 49%. With a sample of 200, we have a margin of error that allows the possibility of a range of answers from Yes equaling 51% and No equaling 41% to Yes equaling 35% and No equaling 57%.

Likewise for the second graphic, where the responses are Yes equals 32% and No equals 43%. Here, the margin of error allows a possible range of answers from Yes equaling 40% and No equaling 35% to Yes equaling 24% and No equaling 51%.

In other words, this data tells us nothing. So why publish it? As presented, it is at best irrelevant and at worst deceptive.

I hate to be so harsh, but if you are going to present data taken via sampling as relevant to opinions and policies regarding anything, whether it's Microsoft's role in the software industry or the viability of ATM at this particular time, you better make sure your sampling data is up to the task.

Jeffrey Whitmer
PC support specialist
Department of Computer Science
Indiana University
Bloomington, Ind.

See **Letters**, *page 53*

Send us letters

Have you seen an article in *Network World* with which you strongly disagree or heartily concur? If so, send us your thoughts in a letter to the editor.

Letters can be sent to us via mail to Editor, *Network World*, 161 Worcester Road, Framingham, Mass., 01701; via fax to (508) 820-3467; or via the Internet to network@world.std.com.

Help desk

Continued from page 2

provider is to post a request for information in the alt.internet.access.wanted news group on Usenet.

Our organization has a 20-node Novell, Inc. NetWare 2.2 network, which will soon be upgraded to NetWare 3.12. We are running a specially customized database written in COBOL 85; it will be converted to Informix Software, Inc.'s 4GL, which runs on Unix, within two years. We do not want to have to run two networks. Will we be able to run Informix 4GL on an MS-DOS NetWare 3.12 network? Also, what is the difference in access time between DOS and Unix?

Barry Tibbetts, Kennebunk, Maine

Harry Lipkind, a consultant and senior analyst at Corporate Software, Inc., a PC software products, support and systems integration company based in Norwood, Mass., replies:

Informix 4GL, as well as other applications developed in this language, will most certainly run on a DOS NetWare network. You will, however, have to ask the database vendor whether its application will be available for a NetWare network.

In addition, you cannot compare access times between MS-DOS and Unix because the systems do not have similar loads. With a PC network, processing is spread among the workstations and servers; with a Unix system, only the host and data servers perform the processing. A Unix host, therefore, must be a more powerful system to handle all the tasks from the workstations.

A properly sized system (servers that use fast disks, the appropriate amounts of RAM and up-to-date technology) will be equally fast under both operating systems. A Unix-based data server could be attached to a NetWare network so the same workstations could access either the NetWare server or the Unix data server. The Unix server, however, would require duplicative administrative work (users and disk access permissions) but not a second network.

Letters

Continued from page 52

Editor's note: You're right that something was awry with the pie charts appearing in the third installment of the "Microsoft sets the standards" series. The percentages were accurate, but were applied to the wrong portions of the pie.

You also raise good questions about the survey, which was not intended to be an exhaustive investigation of user opinions. It is a sampling of reader views that supplemented the comments of corporate network executives, industry and analysts and vendor officials.

A sample size of 1,000 or more would be ideal — that's the minimum sample size we use for major research articles like our Salary Surveys. But this research was simply intended to take the pulse of the marketplace. Whatever the variance, it shows that readers are divided on the issue of Microsoft's standards-setting power.

Take a realistic view of Mosaic

For the last month I have been using the Internet. The deciding factor in my decision to hook up was the recent availability of a Point-to-Point Protocol/Serial Line Internet Protocol (SLIP)-type connection at a similar cost to that for a cable television subscription.

Now that I have had some exposure, it seems that a 14.4K bit/sec Internet connection is inadequate for running Mosaic.

Waiting long periods of time, sometimes several minutes for binary files like in-line images and animation, does not allow Mosaic to work in a spontaneous, interactive way.

Seeing that many types of files, such as Motion Picture Experts Group animations, can easily be more than a megabyte in size, Mosaic needs a connection that can move multimegabytes per second.

Today, the cost of this speed is out of sight for small organizations and private individuals. In addition, the use of Mosaic depends on the availability of the remote server it interacts with. It seems many of the most interesting sites are overloaded and respond very slowly, if at all.

Before we all wax poetic about Mosaic, let's get the technology and cost issues settled.

Andrew Hess
Independent marketing consultant
Cleveland

The real answer

Regarding Mark Gibbs statement that "the secret to life, the universe, and everything...is 42" (Sept. 26, page 24):

No, no, no — the *answer* to the *question* of life, the universe, and everything is 42, which is qualitatively different from saying the secret of life is 42. The precise question of life, the universe, and everything is, of course, unknown, since the big computer that used to calculate the question was unfortunately destroyed.

Richard Masoner
Software engineer
Central Data Corp.
Champaign, Ill.

Meaning of life

In his column "Perfection and the perfect squeegee," Mark Gibbs wrote "...I already know the secret to life, the universe, and everything. It is 42."

Please enlighten me. What is the meaning of 42?

I think Gibbs' column is great. It's the first article I turn to (and sometimes the only article I turn to), and I'm never disappointed.

James Hughes
Manager of data processing
Denver Museum on Natural History
Denver

Gibbs' response: According to Douglas Adams' book The Hitchiker's Guide to the Galaxy, *the answer to life, the universe, and everything is 42. The answer was determined by a race of pandimensional beings who built a vast computer called Deep Thought.*

After several million years of "thinking," the computer told the beings the answer was 42. They felt they'd been cheated until Deep Thought pointed out that the problem is that the answer is useless without knowing the question.

To find the question to the answer, they built bigger computer based on a biological matrix. It was called the Earth.

Because the Earth was really a computer, all of the ape-like beings that wandered about the surface of the computer spent a lot of time puzzled as to why nothing seemed to make much sense. (Note the "was." In the first chapter, the Earth is demolished to make way for a hyperspace bypass.)

NETWORK WORLD DIRECTORY OF SERVICES

NetDraw Clip Art for Building Networks™

Let your network diagrams speak loud and clear for you with *Network World's* NetDraw® clip-art software! Also now available is NetDraw Plus™ - a stand-alone clip-art library complete with a powerful drawing application for Windows. Over 330 professionally drawn network graphics will help you communicate your networks more effectively.

Call 800-643-4668 to order your copy today!
Fax-Back Document Code #10*

NetText™
An on-line library of *Network World* articles

With a subscription to NetText™ Online you can search three full years of every article printed in *Network World* and *Computerworld*! The answers to all your network questions are just a local phone call away. Our easy to use communications software for NetText™ is available for MAC, DOS or Windows platforms.

Call 800-643-4668 to subscribe today!
Fax-Back Document Code #25*

NETWORK WORLD TECHNICAL SEMINARS

Network World Technical Seminars are one and two-day, intensive seminars in cities nationwide covering the latest network technologies. All of our seminars are also available for customized on-site training. Our Fall line-up of seminars includes; *TCP/IP: Analyzing the Protocols of the Internet, Internetwork Management: Understanding SNMP & SNMPv2* and *Capitalizing on the Internet.*

Call 800-643-4668 to register today!
Fax-Back Document Code #55* & #60*

REPRINTS

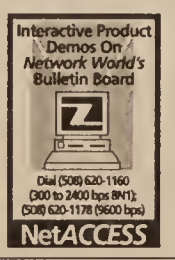
Publicize your press coverage in *Network World* by ordering reprints of your editorial mentions. Reprints make great marketing materials and are available in quantities of 500-10,000.

To order contact Reprint Services at 612-582-3800 or 315 5th Ave. N.W., St. Paul, MN 55112.

NETWORK WORLD TECHNICAL B•O•O•K•S

Published by IDG Books, our newest book; *Network Security SECRETS* provides you with vital expertise on data protection, passwords, encryption, viruses, remote access and more!

Call 800-762-2974 to order your copy today!
Fax-Back Document Code #35*



NetACCESS

Use NetACCESS to download demonstration copies of products offered by *Network World* advertisers for a trial run. To sample the variety of demos, use any personal computer to reach our BBS at 508-620-1178. (8N1, up to 9600 bps)

***Our instant fax-back service delivers information on many of the above products. Dial 800-756-9430 from your touch tone phone and use the appropriate document code to have information faxed right back to your fax machine!**

Network World Advertising
Colin Ungaro, President/Publisher
Thomas J. Wilson, Vice President, Advertising Director
Eleni Brisbois, Sales Assistant
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 879-3167

Sales Offices

NEW YORK/N. NEW JERSEY
Carol Lasker, Eastern Sales Manager
Tom Soevyn, Manager, Demographic Editions
Dail Reid, Sales Assistant
365 W. Passaic St., Rochelle Park, NJ 07662
(201) 587-0090/FAX: (201) 712-9786
Rick Groves, District Manager
(610) 341-6025/FAX: (610) 254-8958
351 E. Conestoga Road, Wayne, PA 19087

BOSTON
Donna Pomponi, Senior District Manager, N.E. Region
Nancy Robinson, District Manager
Jolene Springfield, Sales Assistant
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 651-1853

S. NEW JERSEY/PHILADELPHIA/D.C.
Jacqui DiBianca, District Manager
Patricia DeBiase, Sales Assistant
(610) 971-0808/FAX: (610) 254-8958
351 E. Conestoga Road, Wayne, PA 19087

CHICAGO
Dan Gentile, Midwest Regional Sales Manager
Anna Gabriel, Sales Assistant
1011 E. Touhy Avenue, Suite 550
Des Plaines, IL 60018
(708) 297-8855/FAX: (708) 827-9159

SAN FRANCISCO
Lisa Hall, District Manager
Sandra Kupiec, District Manager
Paula Connor, District Manager
Beverly Davis, Sales Assistant
Carol Stiglic, Sales Assistant
894 Ross Drive, Suite 200, Sunnyvale, CA 94086
(408) 541-8630/FAX: (408) 541-8640

ATLANTA
Don Seay, District Manager
Terry Sanders-Prentice, Sales Assistant
Lakeside Commons, 990 Hanamond Drive,
Suite 600, Atlanta, GA 30328
(404) 394-7509/FAX: (404) 255-5123

LOS ANGELES
Amy C. Bartulis, District Manager
Julie Haws, Sales Representative
Tracy Pennell, Sales Assistant
2171 Campus Drive, Suite 100, Irvine, CA 92715
(714) 250-3006/FAX: (714) 250-4881

DIRECT RESPONSE ADVERTISING
Response Card Decks/ActionCenter/Marketplace
Joan Bayon Pinsky, Sales Director
Clare O'Brien, District Manager
Toni Clayton, Account Manager
Caterina Campisano, Account Executive
Chris Gibney, Sales Assistants
(508) 875-6400/FAX: (508) 628-3976

RECRUITMENT ADVERTISING
Pam Valentinas, Director of Recruitment Advertising
Denise Baer, Sales Assistant

ADVERTISING OPERATIONS
Karen Wallace, Manager of Advertising Operations
Cathy Sampson, Sr. Advertising Account Coordinator
Ann Lewis , Advertising Account Coordinator
Deborah McKenna, Advertising Billing Coordinator

MARKETING
Evilee Thibeault, Vice President Marketing
Joanne Wittren, Marketing Services Manager
Kristin Schiller, Marketing Specialist/Promotion
Lynda Fitzpatrick, Market Research Analyst

SPECIAL PROJECTS
William Reinstein, Vice President of Business Development
Debra Mahler, Product Specialist
Christie Sears, Operations Coordinator
Alayne Arntz, Operations Assistant
FAX: (508) 820-1283

RESEARCH
Ann MacKay, Research Director

CIRCULATION
Deborah Winders, Vice President Circulation
Richard Priante, Director of Circulation
Bobbie Cruse, Assistant Circulation Director
Mary McIntire, Circulation Assistant

PRODUCTION SERVICES
Jeff Pennett, Vice President Network/Production Services
Ann Finn, Production Director
Greg Morgan, Production Coordinator
FAX: (508) 875-3090

REPRINTS
Donna Kirkey, Reprint Manager/Graphic Designer

LIST RENTAL SERVICES
Kelly Martin, List Rental Sales
P.O. Box 9151, Framingham, MA 01701-9151
(508) 879-0700

NETWORK INFORMATION SERVICES
Jeff Pennett, Vice President Network/Production Services
Jack McDonough, Network Manager
Anne Nickinello, Production Systems Manager

DISTRIBUTION
Bob Wescott, Distribution Manager
(508) 879-0700

IDG
Patrick J. McGovern, Board Chairman
Walter Boyd, President
William P. Murphy, Vice President Finance

Network World is a publicatioo of IDG, the world's largest publisher of computer-related information and the leading global provider of information services on informatioo technology. IDG publishes over 200 computer publicatioos io 63 couotries. Forty million people read ooe or more IDG publications each mooth. *Network World* contrihutes to the IDG News Service, offering the latest on domestic aod interoatiooal computer news.

Today, Doctor Jack Moncrief will cover 130 miles and see 4 patients. In 45 minutes.

Without leaving his office. Instead, he'll conduct remote consultations over an interactive audio, video and data network that "teleconnects" his office in Austin, Texas, with a clinic in rural Giddings.

With this Southwestern Bell videoconferencing technology, physicians like Dr. Moncrief are able to speed diagnoses in life-threatening situations, as well as save travel time and money. And the same technology is invaluable in almost any industry. Businesses use it to conduct videoconference meetings. Schools use it for teaching. Local governments use it for remote arraignment of prisoners and for monitoring.

In fact, it's useful whenever you want to transfer files or documents reliably between locations while maintaining constant visual contact. Notes Dr. Moncrief, "In about 45 minutes, I can take care of a group of patients that would require me to drive and make rounds for seven hours. And I can 'see' patients as well or better, because I can zoom the camera up close."

Call our toll-free number to learn how you can receive information on our data and video networking products.

1-800-859-SWBT, Ext. 331

Southwestern Bell Telephone

"The One to Call On"®

Net management platforms *on the move*

Vendors ready a new genre of platforms that sport distributed processing and offer tighter application integration capabilities.

By Mark Miller

Users setting out to tour the network management platform marketplace will find vendors taking them down some new paths that lead to products with revised architectures and advanced capabilities.

Platform vendors are busily recasting their products to work in client/server and distributed processing environments. They are also adding greater scalability, object-oriented technology and data repositories to their offerings, as well as providing tighter integration with management applications.

"All network management platforms are in for a major retooling within the next two years," says Richard Villars, director of network management research at International Data Corp., a Framingham, Mass., market research firm. During this time, users will also see net management platforms take on the role of managing computer systems in addition to networking equipment.

Key platform vendors are making product announcements and issuing statements of direction faster than you can say "GetRequest."

Cabletron Systems, Inc. recently released its client/server-based Spectrum 3.0 platform. Hewlett-Packard Co. is promising to deliver distributed processing and other advanced features in new versions of its HP OpenView platform — dubbed Tornado and Synergy — during the next year.

IBM is making plans to roll out Karat, an object-oriented platform that will merge NetView/6000 net management capabilities with systems management. SunSoft, Inc. is moving ahead on its Project Encompass, an object-oriented platform that will provide tight integration with a variety of different vendors' management applications.

In addition, platform vendors are teaming with one another and with independent software vendors (ISV) to strengthen both their products and marketing efforts. For instance, HP and SunSoft have licensed Los Altos, Calif.-based NetLabs, Inc.'s DiMONS management platform technology as the basis for their next-generation products, and NetLabs has refocused its strategy to develop applications that will run on those new platforms.

For some users, all this retooling can't come soon enough.

"The tool sets available today are not workable for distributed management of very large networks," says Frank Belland, senior communications consultant at Martin Marietta Corp. in Orlando, Fla.

Martin Marietta's network is larger than most, however, with more than 80,000 IBM Systems Network Architecture nodes, 60,000 TCP/IP nodes, plus Apple Computer, Inc. AppleTalk, Digital Equipment Corp.

Continued on page 56

NETWORK WORLD SHORT LIST 1994

Network management platforms

- **Cabletron Systems, Inc.** *Spectrum 3.0*
- **Hewlett-Packard Co.** *HP OpenView family of products*
- **IBM** *NetView/6000 family of products*
- **SunSoft, Inc.** *SunNet Manager 2.2*

Complete details about The Short List appear on page 63.

INSIDE

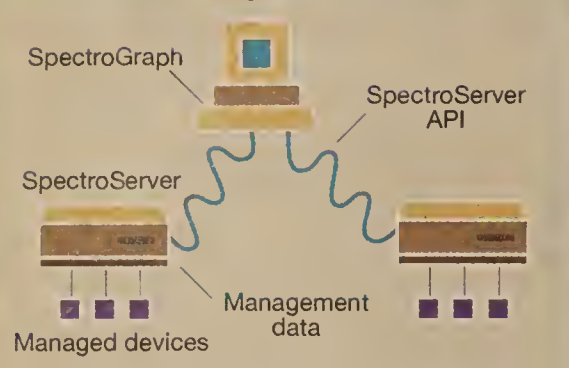
- Platform pricing depends on the packaging. ***Page 56.***
- A quick sort through the product data. ***Page 60.***
- DMI makes it possible to manage the desktop from the platform. ***Page 63.***
- Black & Veatch paths back through its selection process. ***Page 66.***
- Readers report platform usage trend and selection analysis data. ***Page 68.***

Continued from page 55

DECnet and Novell, Inc. NetWare installations. The firm currently uses IBM's host-based and SNA-specific NetView, as well as HP's OpenView for Windows and OpenView for Unix and Cabletron's Spectrum to manage its networks.

The Spectrum model

Figure 1



With Cabletron's Spectrum 3.0, SpectroServers are used to collect management data from local devices while SpectroGraphs use an API to pull data from multiple SpectroServers.

GRAPHIC BY TERRI MITCHELL

Each of the platforms Belland uses brings something different to the table, which makes selecting a single enterprisewide management platform a tricky, if not impossible, task. One factor helping users in the decision is that there are really only a handful of products that fall into this category.

At a minimum, each platform includes a few basic ingredients. Chief among them are a graphical user interface (GUI), support for a database structure, such as the Management Information Base (MIB) used in Simple Network Management Protocol environments, and a series of application program interfaces (API) that enable the platform to run off-the-shelf or custom-developed management applications.

Platforms begin to differentiate themselves in such areas as the protocols they use to collect information from managed devices, the operating system on which they run and the hardware platform they use. Other areas of differentiation include whether the platform comes bundled with basic management applications and the ability to exchange data with other vendors' platforms.

"Many users don't make a comprehensive evaluation before purchasing a network management platform and end up having to redesign their system in a few years," says Jill Huntington-Lee, principal analyst at Brandywine Network Associates in Cinnaminson, N.J.

She advises users to check on the platform's openness by making sure its APIs are published and an applications development kit is available. Users should also measure the platform's flexibility to accommodate third-party applications and judge the platform vendor's staying power in the market.

SNMPv2 support

Hewlett-Packard Co. and SunSoft, Inc. currently provide support of SNMPv2. Other vendors that pledge support for SNMPv2 and the projected date of availablity include:

- **Applied Computing Devices, Inc. 2Q 1995**
- **Bytex Corp. 2Q 1995**
- **Cabletron Systems, Inc. 1Q 1995**
- **Castle Rock Computing, Inc. 4Q 1995**

ON THE HIGH ROAD

At the high end of the market are Unix-based platforms provided by such companies as Cabletron, HP, IBM and SunSoft. These platforms can wind up costing well over $100,000 when applications and other needed components are added to a package (see story, this page). Typically included in these packages are a number of basic device monitoring applications, extensive graphing and reporting capabilities, MIB browsers and compilers, automation tools such as topology discovery and mapping facilities, and development tools.

The list of management protocols supported by high-end platforms is quite extensive and can include SNMPv1, SNMPv2, the Common Management Information Protocol (CMIP), CMIP over TCP/IP (CMOT) and CMIP over Logical Link Control (CMOL). High-end platforms also provide published APIs, and their vendors often pride themselves with the weight of the catalogs that list the third-party applications developed for their platforms.

At the other end of the market are platforms that run under DOS or Windows, with considerably less functionality. A typical low-end platform might be limited to managing a TCP/IP net, without support for other environments such as IBM's SNA. APIs may not be defined or published, and third-party applications may be unavailable — limiting the functionality of low-end platforms to a "what you see is all you're gonna get" scenario.

Nevertheless, low-end platforms, such as Castle Rock Computing, Inc.'s SNMPc, fill a key market niche and are certainly better than going without a management platform altogether.

TAKING ON NEW SHAPES

The high-end platforms are the ones undergoing the most reshaping. Cabletron is leading the charge toward distributed management with release of its Spectrum 3.0, which uses client/server and object-oriented technology to enable users to build enterprisewide network management environments.

Spectrum 3.0 comprises three key elements: SpectroServers, which are servers that collect and store information from managed devices; SpectroGraphs, which are clients that retrieve and display management data; and SpectroServer APIs, which enable SpectroServers and SpectroGraphs to communicate (see Figure 1).

SpectroServers include an object-oriented modeling engine and an integrated database. Each SpectroServer can be configured to collect management data from devices in a geographical region. The modeling engine enables users to partition large networks into logical subnets, each of which can be managed by a different SpectroGraph.

For instance, while a SpectroServer collects and stores real-time statistical information from all network components in a region, fault information about hubs can be sent to one SpectroGraph client while subnet utilization data can be sent to another.

SpectroGraph clients include a customizable Motif/X Window System-based GUI that presents users with a variety of visual representations of the information stored in the SpectroServers. Cabletron terms these visual representations landscapes, with each landscape having its own icons on SpectroGraph clients. When clicked on, the icons invoke commands needed to pull a variety of information — such as a network topology layout, physical or location layout, or an organizational layout — from one or more SpectroServers.

This distributed architecture realizes three benefits. First, SpectroServers can be located close to managed devices, thus reducing management polling traffic across expensive WAN links. Second, the overall management environment becomes more scalable because additional SpectroServers and SpectroGraphs can be added as the network grows. Lastly, one SpectroServer or SpectroGraph can back up another, increasing overall reliability.

Platform flexibility is also an architectural cornerstone of Spectrum 3.0. Digital's Ultrix-based DEC 5000, IBM's AIX-based RISC System/6000 and Silicon Graphics, Inc. Irix-based workstations, as well Sun Microsystems, Inc.'s SunOS- or Solaris-based SPARCstations, can be used as SpectroServers or SpectroGraphs.

"In addition to support for numerous platforms, we tried to make the installation as painless as possible," says Chris Crowell, Spectrum development project leader at Cabletron. "All the user has to do is take the CD out of the box, place it in the drive and run INSTALL."

Cabletron added a number of user interface enhancements in Spectrum 3.0, as well. These include the ability to zoom in to get a closer look at a particular view of the network as well as the ability to move multiple icons from one view to another. Other user interface enhancements include the ability to automatically arrange the network topology into a tree or star diagram and add links between devices shown on the screen.

SunSoft is also rising to the occasion with a distributed processing strategy of its own. However, SunSoft and other Cabletron competitors are at least four months behind in rolling out true distributed capabilities.

Oddly, many analysts say only NetLabs' DiMONS can compete in offering distributed capabilities. But NetLabs is retreating from the net management platform market as it strikes agreements to license its technology to SunSoft, HP and others, and focuses its energy on building applications.

"A distributed management system is necessary to support the size and complexity of distributed computing environments," acknowledges Joe Matibag, senior product manager at SunSoft. To meet the requirement for a secure, multiuser distributed management system, SunSoft is working on its next-genera-

Continued on page 58

Platform pricing is often a package deal

As tough as it is, selecting the right network management platform software is just the first step in building a complete management system. To go the rest of the way, users have to pick the workstation hardware as well as the management applications that will run on top of the platform.

Vendors realize the problem users face and are offering a variety of packaging schemes that run the gamut from a one-size-fits-all bundled solution to a best-of-breed approach that allows users to purchase hardware and applications separately. The cost of these various packaging schemes can also vary widely — from a low of $500 for a very basic bundled package to a high of over $100,000 for a soup-to-nuts package.

In any given packaging scheme, users must make sure they acquire five separate components: the hardware platform, the operating system, management platform software, core and device-specific applications, and an application development kit.

The hardware platform, typically a Unix-based workstation, will cost between $4,000 and $20,000, depending on such variables as the amount of random-access memory and storage. An operating system — such as Hewlett-Packard Co.'s HP-UX, IBM's AIX or SunSoft, Inc.'s Solaris — will cost from $1,000 to $5,000, depending on the licensing agreement. The platform software itself is typically priced from $5,000 to more than $20,000.

Bundled packages that include a high-end, Unix-based workstation and management platform software typically come with a standard set of applications. These standard applications perform network node discovery and topology mapping functions, poll Simple Network Management Protocol-manageable devices and provide an iconic representation of network resources. Other applications include Management Information Base (MIB) tools, such as a MIB browser and compiler, an event handler to receive and process traps or alerts, and data-gathering and analysis tools.

Two additions to a standard bundled package may be required to support specific network management functions, though. First, a development tool kit may be required for building custom applications. Then there is the need for device-specific applications that manage a particular vendor's bridge, router or switching hub, for instance.

Low-end bundled packages typically consist of personal computer or Microsoft Corp. Windows-based applications. An example is Castle Rock Computing, Inc.'s SNMPc, which runs on industry-standard PC hardware and costs a mere $495. But the functionality of these low-end bundled packages is limited to the very basics.

Why Is Everybody Talking About 100Mbps But Buying Kalpana EtherSwitches?

Your Skinny Little Ethernets Can Actually Outmuscle the Fat Pipes.

Fact is, network performance is limited by what your servers can process. So you can squeeze as much or more out of them—about 20Mbps, tops—with EtherSwitches as you can with costly FDDI or 100Mbps Ethernet.

Running real applications, popular NetWare 486 servers top out at about 20Mbps, with EtherSwitch ahead of FDDI and neck-and-neck with 100Mbps Ethernet.

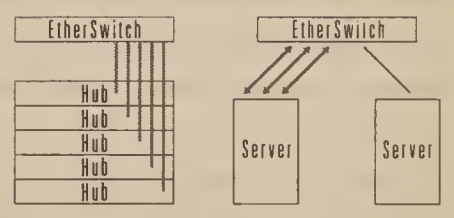
No wonder, with more than 100,000 ports delivered, Kalpana EtherSwitches have now become standard equipment on the LAN scape.

They *work*. Right now. Every time. You plug in a Kalpana EtherSwitch®, you get a big performance boost. Immediately. Without writing off the investment you've already made in your Ethernet hubs, adapters, servers and wiring.

They *cost less*. Start with our per-port price of about $500, factor in the number of users you can hook up to every one of our switched 10Base-T ports, and you wind up with, by far, the most cost-effective answer to your performance problems.

And they *deliver*. Not only more bandwidth than other switch solutions, but as much or more than FDDI and 100Mbps Ethernet in side-by-side comparison of practical applications.*

Our new Switch.NLM software balances the distribution of network traffic between two or more adapters in the same Novell server, boosting aggregate throughput to the server to more than 60 Mbps. Plus, if an adapter fails, Switch.NLM automatically reroutes traffic to the others.



Plug in an EtherSwitch for big performance boosts in stackable and multi-segment hubs or server clusters.

Instead of rolling the dice on a new infrastructure and an unsettled standard, you get the bandwidth you want *now* with what you already have in place. More bandwidth, in fact, than you can get with higher-speed shared technologies. No matter how much noise they make.

- Spanning Tree 802.1d Protocol
- Address Filtering
- Downloadable Code
- Virtual EtherSwitch LANs
- Full Duplex
- EtherChannel
- Flexible Media Options
- Fault Tolerance
- Near-Zero Latency (cut-through)
- Rackable, Stackable 1.75" Height
- Plug-and-Play Simplicity
- SNMP Management

That's why EtherSwitch continues to outsell all other switching solutions combined.

yes It runs with NetWare

Call **800-488-0775** for a Try'n Buy evaluation unit, or an animated disk that will help you evaluate Ethernet switching.

Data Comm Magazine Top Performer March 1994

For an immediate FAX-back response, call **(408) 749-1900, extension FAX**, and select the information you want from the document index. For a copy of Infonetics Research's "Server Bandwidth Congestion—Practical Limits; 10 Mbps versus 100Mbps Solutions", select document number 353.

Kalpana
The EtherSwitch Company

**Infonetics Research, Inc., Server Bandwidth Congestion—Practical Limits. EtherSwitch is a registered trademark of Kalpana Inc. From outside the United States, please call 408-749-1600.*

Continued from page 56

tion product, code-named Project Encompass.

"Project Encompass will provide advanced management tools and an object-oriented data repository," Matibag says.

Other key features include advanced event management capabilities that will enable customers to define rules on how their network can be optimized and how configuration tasks can be automated.

This next generation of SunNet Manager, which is scheduled for a spring release, incorporates NetLabs technology. Project Encompass is designed for compatibility with current SunNet Manager 2.2 platforms plus SunSoft's new Cooperative Consoles product, which is scheduled for availability next month.

The Cooperative Consoles product is an interim step in delivering fully distributed processing features. With Cooperative Consoles, users will be able to link multiple SunNet Manager consoles together to form a single, logical shared-data repository. Topological information, plus details of significant network events, can thus be shared between workstations running SunNet Manager in different physical locations. But this approach requires each management console to run a full version of SunNet Manager as well as a software extension that provides the Cooperative Consoles link (see Figure 2).

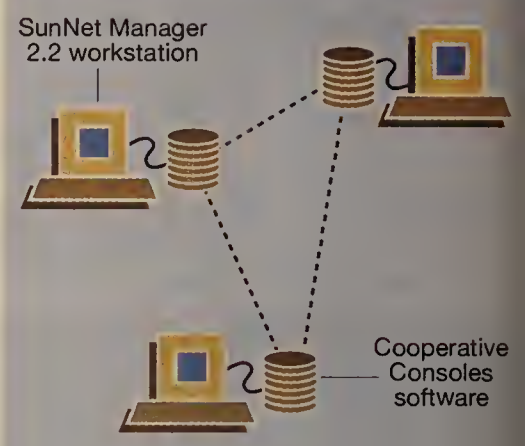
HP only recently started divulging details — albeit sketchy ones — of its Tornado and Synergy projects, which will add distributed capabilities to OpenView (*NW*, Aug. 1, page 1; Aug. 15, page 1). HP intends to grace OpenView with a common data repository and the ability to spread network displays across different workstations in a local environment.

The common data repository is a key factor in HP's new architecture, one that will bring a tighter integration between applications and the management platform, says Gordon MacKinney, HP's OpenView program manager. The common repository will include a new data schema that specifies an information structure that net and systems management applications can use to read and write from the database.

Sharing information between different vendors' applications would then be possible. HP has submitted its draft schema to the Management Integration Consortium (MIC), a group of management applications vendors, management platform vendors and users defining standards for tighter integration between management applications and platforms, as well as easier portability of applications.

Cooperating consoles

Figure 2



SunSoft's Cooperative Consoles software lets SunNet Manager 2.2 workstations exchange databases, thus forming a common data repository on each workstation.

GRAPHIC BY TERRI MITCHELL

Formed last May, MIC counts HP, IBM, ISICAD, Inc., Ki Networks, Inc., NetLabs, Peregrine Systems, Inc., Remedy Corp., Sun, UB Networks, Inc. and Unisys Corp. among its applications and platform vendor members.

Eric Olinger, product author with Peregrine Systems and MIC chairman, says the group's mission is to support an open process for the development of management integration services and to ensure that standards are made available to users and vendors.

Since its conception, MIC has formed three working groups: data integration, event handling and asset information management. The first deliverables from these groups, expected in the fourth quarter, will document how applications vendors can demonstrate multivendor integration.

THE OBJECT OF MANAGEMENT

Another significant retooling effort that all major vendors have embraced is the support for object-oriented environments. This may be credited, in part, to the Open Software Foundation, Inc.'s earlier work in defining the Distributed Management Environment (DME), which presented an object-oriented approach to network management and modular application design. But the DME itself has been anything but successful.

"The DME should be taken off life support," says John McConnell, president of McConnell Consulting, Inc. in Boulder Colo. "There just isn't much interest from either the vendors or users for that environment."

A competing scheme from the Network Management (NM) Forum — called OMNIPoint — is a different story, McConnell says.

Continued on page 60

IBM Communications Manager/2

Communicate! Anywhere!

Technology advancement should mean simpler communications. That's why IBM® Communications Manager/2 (CM/2) connects you with hosts and peers whether they're across the corridor or across the continent. It puts the power of personal networking right on your desktop.

CM/2's communications capabilities permit you to connect to multiple hosts with multiple terminal emulation sessions simultaneously.

The freedom to communicate.

In supporting client server and distributed applications, CM/2 provides a System Network Architecture (SNA) gateway that supports OS/2,® DOS, and DOS with Windows™ clients. Also available in IBM's CM/2 Service Release 1.11 is the new SNA Phone Connect which addresses the mobile commuting environment by enabling users to access SNA applications from home, on the road, or from wherever there's a phone line. SNA Phone Connect enables mobile computing by supporting asynchronous and Hayes Autosync connections.

Anytime!

Connectivity Combined with flexibility.

CM/2's connectivity services provide access to a wide variety of LANs and WANs, including COAX, TWINAX, switched lines, leased lines, Token-Ring, Ethernet, and PCNET.

If you're currently using CM/2, you'll want to take a look at the new CM/2 Version 1.1. Enhanced terminal emulation, connectivity, system management and APPN features, as well as support for PCMCIA adapters, are just part of the story. And with our new Distributed Feature implementation, your smaller workstations with minimal disk space can now enjoy the full complement of CM/2 features and functions.

For further information on how CM/2 can enhance your communication requirements, call **1 800 IBM 3333**, ask for (STAR 400).

Operate at a higher level.™

IBM and OS/2 are registered trademarks and "Operate at a higher level" is a trademark of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. All other products are trademarks or registered trademarks of their respective companies. © 1994 IBM Corp. All rights reserved.

IBM®

YOU DON'T HAVE TO BE CERTIFIED TO OPERATE AT&T PARADYNE'S

NEW COMSPHERE 3550 DSU.

With easy installation, preset configurations and remote site control, it doesn't take a genius (or even a highly trained tech staff) to operate AT&T Paradyne's new COMSPHERE 3550 DSU. But you do deserve an award for having the smarts to choose it. Not only do you get **Access the Globe.** high-end Bell Labs technology at a very affordable price. But, you get a host of features no other DSU in this price range can offer. Features like non-disruptive diagnostics and monitoring. Rate adaptation. And optional integral dial backup (with the most reliable dial restoral in the industry). You even get an easy-access front control panel. And flexible two port time-division multiplexing.

It's access, access and more access.
And it's yours
when you call 800 482-3333, ext. 627.

AT&T Paradyne

©1994 AT&T Paradyne. COMSPHERE is a registered trademark of AT&T.

Network management platforms

Company	Product	Platform (4 = 486/386, H = HP 9000, R = RS/6000, S = Sun SPARC, O = Other)	Configuration: Minimum (Bytes): M = Memory, S = Storage	Operating system: AIX	DOS/Windows	HP/UX	OS/2	SunOS	Ultrix	Unix	Windows	Windows NT	Other	Protocols: Network: D = DECnet, I = IPX/SPX, OS = OSI, S = SNA, T = TCP/IP, O = Other	Protocols: Mgmt.: CP = CMIP, CT = CMOT, N = NMVT, R = RMON, S1 = SNMP MIB1, S2 = SNMP MIB2, O = Other	Operating environments: Type: C = Centralized, D = Distributed, E = Either	Operating environments: GUI: L = OpenLook, M = Motif, OS = OS/2 PM, W = Windows, O = Other	Operating environments: Customization: M = Menus, R = Reports, S = Screens	Operating environments: Mgmt. frameworks: D = DME, OP = OmniPoint, O = Other	Features: Development tools	Features: Desktop mgmt. interface	Interoperability: Between vendor platform and: C = Cabletron Spectrum, D = Digital MCC, H = HP OpenView, N = NetView, NM = Novell NMS, NV = IBM NetView/6000, S = SunNet Manager, O = Other	Security: Password	Security: Privileges: S = Standard, U = User-definable	Security: A = Secure access, E = Encryption	Price: Min. cost/Max. cost for software only
Applied Computing Devices, Inc. (812) 232-6051	Systems That Manage Systems	R, O	M: 128M S: 2.0G	✔					✔	✔			✔	OS, S, T, O	N, S1, O	E	M	M, R, S	D, OP, O	✔		C, D, H, N, NM, NV, S, O	✔	U	A, E	$29,000 (1)
Armon Networking, Inc. (800) 499-7666	OnSite	H, R, S	M: 24M S: 25M	✔		✔		✔		✔				D, I, OS, S, T, O	R, S1	E	L, M	R, S		✔		H, NV, S	✔	S		$3,000/ $9,000
Bytex Corp. (508) 366-8000	Series 7700 NMS for HP OpenView Unix	S	M: 64M S: 424M					✔						T, O	N, R, S1, S2, O	C, D, E	M	R	D, OP	✔		O	✔	S		$13,000/ $19,000
	Series 7700 NMS for HP OpenView Windows	4	M: 8M S: 20M		✔									T, O	R, S1, S2, O	C, D, E	W	R	D, OP	✔		C, D, H, N, NM, NV, S, O	✔	S		NA/ $3,495
Cabletron Systems, Inc. (603) 332-9400	Spectrum 3.0	R, S, O	M: 64M S: 300M	✔				✔	✔				✔	D, S, T	N, R, S1, S2, O	E	L, M	M, R, S		✔		C, N, NM, NV, S	✔	U	A	NA/ $15,000
Castle Rock Computing, Inc. (408) 366-6540	SNMPc	4	M: 8M S: 20M								✔	✔		I, T	R, S1, S2	C	W	M, R, S		✔			✔	S		NA/$495
Digital Equipment Corp. (800) 344-4825	PolyCenter Manager on NetView	O	M: 64M S: 1.5G							✔			✔	D, OS, T	CT, R, S1, S2	E	M	M, R, S	D, OP	✔	✔	D, O	✔	S		$15,500/ $20,500
Hewlett-Packard Co. (800) 533-1333	HP Interconnect Manager/UX	H	M: 40M S: 20M			✔								T	S1, S2	C	M	S		✔		H, O	✔	S	E	$5,000/ $20,000
	HP Interconnect Manager/ Windows	4	M: 8M S: 3.2M								✔			I, T	S1, S2	C	W	S		✔		O	✔	S	E	$495/ $2,995
	HP OpenView History Analyzer/UX	H	M: 32M S: 200M			✔								T	S1, S2	C	M	R	O			H	✔			NA/ $6,000
	HP OpenView Traffic Expert/UX	H	M: 64M S: 200M			✔								T	S1, S2	C	M	R	O			H	✔			NA/ $8,000
	HP OpenView Traffic Monitor	4, H	M: 16M S: 20M			✔					✔	✔		I, T	S2	C, D, E	M, W		O			O				$2,999/ $3,999
IBM (800) 426-2255	IBM NetView for AIX	R	M: 64M S: 200M	✔										D, I, S, T	CP, CT, N, R, S1, S2, O	E	M, W	M, R, S	D, OP	✔		H, N, NV, S	✔	U	A	NA/ $16,500
	IBM NetView for OS/2	4	M: 8M S: 40M				✔							I, S, T, O	S1, S2	D	OS	M, S	O	✔		N, NV				NA/ $4,995
	IBM NetView for Sun Solaris	S	M: 65M S: 48M										✔	T	CT, N, S1, S2	E	M, W	M, R, S	D, OP	✔		H, N, NV, S	✔	U	A	NA/ $15,650
	IBM NetView for Windows	4	M: 16M S: 180M		✔									T	S2	E	W	R, S					✔	S		$1,420 (2)
Novell, Inc. (800) 638-9273	NetWare Management System 2.0	4	M: 12M S: 60M		✔									I, T	S2	E	W	R, S		✔	✔		✔	U		NA/ $2,495
Racal-Datacom, Inc. (800) 722-2555	CMS 400	4	M: 1M S: 10M		✔						✔	✔	✔	T, O	R, S1, S2, O	E	L, M, OS, W, O	R, S		✔		C, D, H, N, NM, S, O	✔	U	A	$2,000/ $75,000
	CMS 6000	R, S	M: 64M S: 400M	✔				✔						T, O	CT, N, R, S1, S2	E	M	S	D, O	✔		H, N, NV	✔	U	A	$15,000/ $30,000
SunSoft, Inc. (800) 786-7638	SunNet Manager 2.2	S	M: 32M S: 400M					✔					✔	D, OS, S, T	CP, N, S1, S2, O	D, E	L	M, R, S	OP, O	✔			✔	S	E	NA/ $4,995
VisiSoft, Inc. (404) 320-0077	VisiNet 2.5	4	M: 4M S: 80M		✔		✔				✔	✔	✔	I, T, O	S2	E	W	R		✔	✔	H, NM, NV, S	✔	S	A	$795/ $2,225

Products highlighted by color were selected for The Short List.

Chart compiled by Chen Pequet

FOOTNOTES:
(1) Customized applications cost from an additional $15,000 to millions of dollars.
(2) This is the introductory promotional price, which will go up to $1,895 with a new release due early next year.

CMIP = Common Management Information Protocol
DME = Distributed Management Environment
GUI = Graphical user interface
MCC = Management Control Center
MIB = Management Information Base
NA = Not applicable
NMS = NetWare Management System
NMVT = Network Management Vector Transport
PM = Presentation Manager
RMON = Remote Monitoring

Continued from page 58

"OMNIPoint is just CMIP repackaged for the third time; therefore, it is easy for vendors to adhere to OMNIPoint if CMIP support is included with their products," he adds. "The real value of OMNIPoint is in the awareness it is raising regarding user requirements, such as the need for functional task profiles, quality of service-based management and process-oriented descriptions of network management solutions."

IBM's recently announced Karat strategy calls for extensive use of object-oriented technology to meld network and systems management together (*NW*, Sept. 19, page 1).

A beta version of Karat running under AIX is scheduled for availability this month. The product is being based on IBM's System Object Model (SOM) and Distributed SOM, plus the Object Management Group, Inc.'s Common Object Request Broker Architecture.

With Karat, IBM's existing network management tools, such as NetView/390, NetView/6000, NetView for OS/2 and LAN Network Manager, may be represented as objects, allowing numerous heterogeneous devices to be managed from a central console. OS/2 and Application System/400 versions of Karat are in development.

"When you select a network management system, you are putting your trust and your business in the hands of the vendor you choose," says John Byzek, IBM's director of enterprise management development. "Our customers are asking for help managing their enterprisewide businesses, and there is a lot of chaos in today's networking arena. Our strategy is to help the customer manage its entire businesses, not just the [information technology] assets, and the direction of our future management offerings will leverage off of that goal."

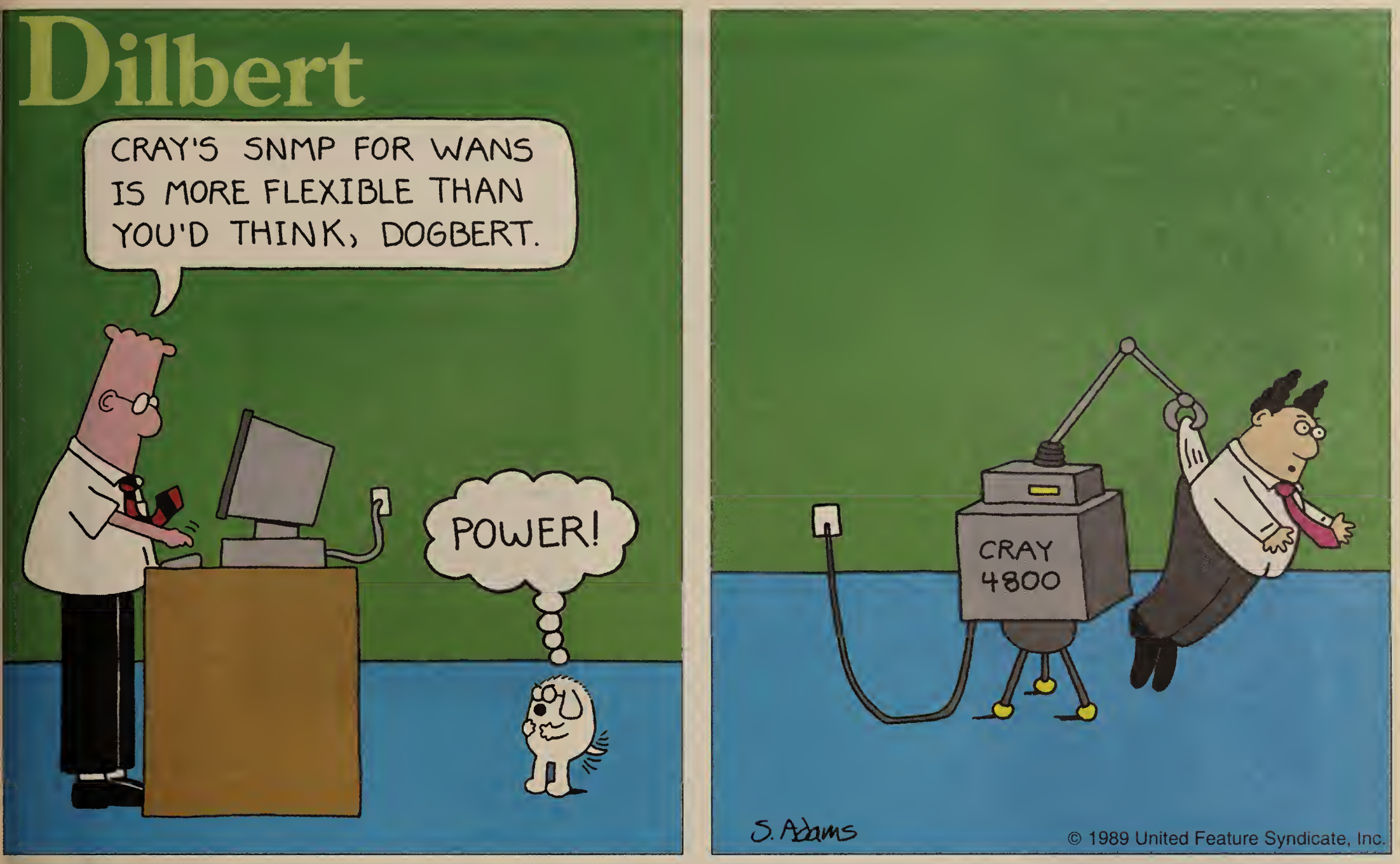
GETTING THE DATA

Even as vendors work on next-generation architectures that embrace emerging technologies, some core capabilities, such as the network management protocol used, will follow a more straightforward progression. For instance, many of the enhancements found in SNMPv2 are now finding their way into many net management platforms.

SNMPv1 has been the de facto standard protocol for internet management for several years, edging out the Open Systems Interconnection-based CMIP for most applications. It, therefore, makes sense for vendors to add the security and bulk data retrieval enhancements incorporated into SNMPv2.

However, device vendors must now start rolling out SNMPv2 agents, says Ron Rusnak, networking project manager at the University of Chicago. Rusnak's group uses a number of

Continued on page 63



Cray WAN Access Products enable SNMP management access across the Wide Area Network.

Most SNMP network management systems have one major shortcoming: they're fine for Local Area Networks, but they don't help you manage the Wide Area Network.

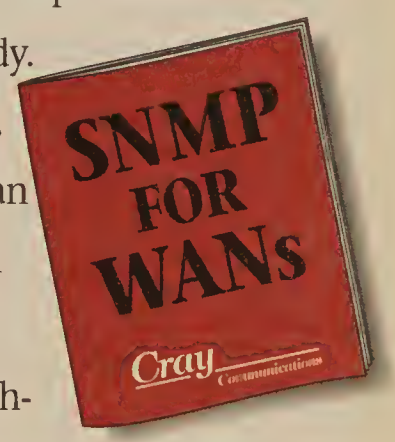
Now, Cray Communications has closed the loop.

Cray is the first and only vendor to support full SNMP management capability across a broad range of WAN products. For example, our 4800-Series CSU/DSUs enable SNMP-managed access to 56K, fractional T1, and full T1 services, used over private, leased, or public frame relay networks.

Our unique approach to network-wide SNMP management can dramatically simplify the management of remote devices, while significantly reducing the cost of managing large enterprise networks.

As a result, you can control your entire network, from a global overview to a single connection, all from one SNMP management console.

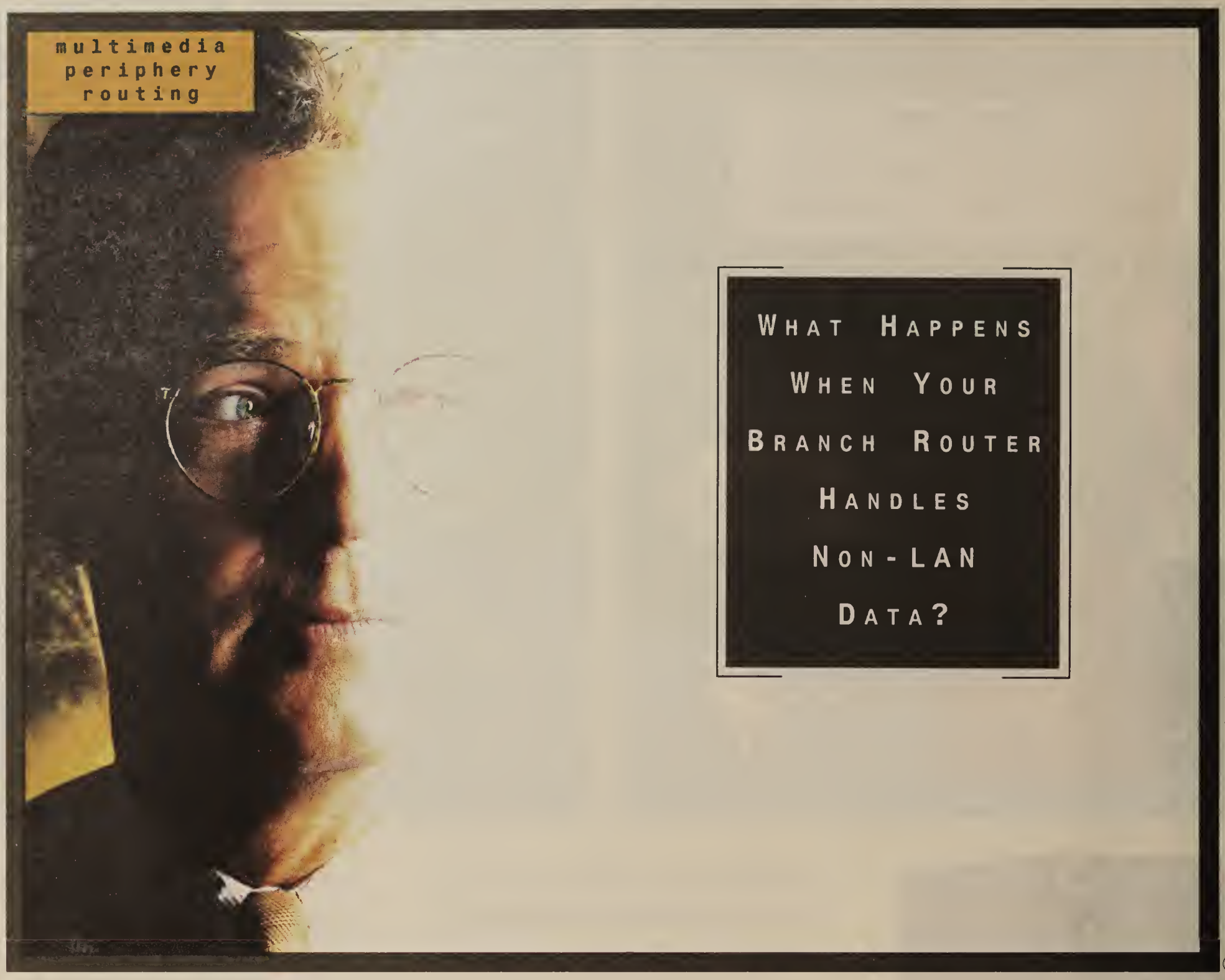
We have more experience in SNMP for both LANs and WANs than any other vendor. In fact, Cray has been shipping SNMP-managed WAN products longer than anybody.



Our white paper, *SNMP for WANs*, is an in-depth discussion of how to manage WAN access throughout your organization. For a **FREE** copy, write Cray Communications, 9020 Junction Drive, Annapolis Junction, Maryland 20701, or call ***1-800-FOR-CRAY*** (1-800-367-2729). Internet: info @ craycomm.com.

Cray Communications

WE INTEGRATE LANs AND WANs.



Ⓜ, Motorola and MPRouter are trademarks of Motorola, Inc. © 1994 Motorola, Inc.

Something's missing with most branch routers. While they're good at routing LAN data, branches have to handle non-LAN data – what other vendors call "non-routable" protocols. Motorola's new 6520 MPRouter™ can route any branch traffic: IP, as well as SDLC, BSC, async and other legacy protocols. And it works directly with your data center's routers. Motorola, with Codex and UDS products, takes the lead. Again. Isn't it time you got the whole picture? Call for a free brochure. **1 800 426-1212, ext. 550**

MOTOROLA

NETWORK WORLD SHORT LIST 1994

Net management platforms

The Short List highlights products that Network World *recommends you examine during the purchasing process for network management platforms. Products were selected based on the current number of users plus availability of applications. Additional criteria were ease of use and configurability, as well as the vendor's architectural directions, including support for object-oriented technology, distributed processing, systems management and tighter integration between applications and databases. These criteria meet the needs of users with multivendor enterprise networks. Your needs may differ.*

■ Cabletron Systems, Inc.

Spectrum 3.0

An early leader in adopting the client/server model in net management platforms, Cabletron offers some interesting capabilities, including an artificial intelligence engine called Inductive Modeling Technology (IMT), which assists users in identifying failed components and diagnosing problems.

Spectrum also runs on a wide variety of Unix workstations and comes with a number of core features, such as automatic node discovery, a media access control layer address locator, an imaging tool kit, a report generator and an on-line data backup facility. Additional applications include trouble-ticket tracking; BlueVision, an integrated Systems Network Architecture and LAN management tool; NV Gateway, a bidirectional gateway to IBM's host-based NetView; MaestroVision, a systems management tool; and SpectroPhone, which sends alarms via phone or pager.

■ Hewlett-Packard Co.

HP OpenView family of products

With more than 35,000 installations and support from over 120 independent software vendors, HP has placed a firm stake in the network management platform ground with its OpenView family of products.

Another high accolade for HP is the number of other vendors — including AT&T and IBM — that license OpenView technology for inclusion in their own management platforms. HP also receives high marks from its customers for creating the OpenView Forum in 1993 to provide a channel for end users to influence product direction.

HP also offers a wealth of applications, including tools for the automatic discovery and mapping of network nodes, as well as the ability to automate actions based on predefined thresholds and to prioritize events. Other HP-provided applications include: Node Manager for NetWare for Novell, Inc. environments; SNA Node Manager for the IBM SNA world; Operations Center, which provides systems management functions; and Software Distributor for electronic software distribution. HP's future looks bright, as the firm is developing new versions that will support distributed processing, an integrated database and SNMPv2.

■ IBM

NetView/6000 family of products

Uniting the enterprise is the goal of IBM's NetView product line, and NetView/6000 products play a key role. The most significant family member is NetView for AIX, which runs on an IBM RISC System/6000 under IBM's AIX. Other family members run on Intel Corp.-based personal computers under OS/2 or Microsoft Corp. Windows or a Sun Microsystems, Inc. SPARCstation running SunSoft, Inc.'s Solaris.

Current NetView/6000 products include a powerful user interface with nested windows that are easy to navigate, Management Information Base (MIB) tools and event displays that catalog Simple Network Management Protocol alarms. IBM's recently announced Karat architecture will extend object-oriented systems management to NetView/6000.

NetView/6000 has won support from other vendors, as well. For instance, Digital Equipment Corp. sells a version of NetView/6000, and third-party vendors have developed more than 130 applications that run on the platform.

■ SunSoft, Inc.

SunNet Manager 2.2

With over 15,000 copies sold and over 100 third-party applications available, SunNet Manager is one of the most popular platforms. SunNet Manager comes with many integrated features, including an intuitive user interface, MIB tools and an event handler. Other SunSoft products extend the reach of SunNet Manager into Digital DECnet, Fiber Distributed Date Interface and NetView environments.

New product directions indicate that SunSoft is not resting on its laurels. The firm's Cooperative Consoles software enables multiple SunNet Manager consoles to share a common database. Project Encompass, scheduled for a 1995 release, will bring SunSoft into the worlds of object-oriented data repositories and multiuser distributed processing.

Continued from page 60

tools, including HP's OpenView and SunSoft's SunNet Manager, to handle more than 200 segments and over 8,000 nodes, running a mixture of AppleTalk, DECnet, Novell NetWare and TCP/IP protocols.

"Network management security is a key issue for academic environments," Rusnak says.

Currently, the university does not allow anyone to issue a standard SNMP Set message to key Cisco Systems, Inc. routers. A Set message can change router configuration settings, and it is too easy for unauthorized personnel to issue Set commands in an SNMP environment. Instead, Rusnak uses a Cisco proprietary network management interface to change router settings.

"Security concerns dictate that we use SNMP more for monitoring than for control," Rusnak says. "But we hope that changes in the future as more vendors start to support SNMPv2."

To extend the reach of SNMP, the Internet Engineering Task Force (IETF) developed the Remote Monitoring (RMON) architecture, which calls for users to place intelligent devices, called probes or RMON agents, at strategic locations within the internetwork. The probe collects statistics regarding the operation of that network segment and reports both current and historical data to the management console. The IETF's RFC 1271 defines an RMON MIB for Ethernet, while RFC 1513 defines one for token ring.

Scott Baily, a network analyst at Colorado State University in Fort Collins, is evaluating RMON to enhance the school's ability to manage 5,000 nodes spread across 80 Ethernet segments in different buildings on campus.

Currently, when a network segment fails, a diagnostic crew, toting test equipment, must be dispatched across the campus. "Intermittent problems are the most challenging," Baily says. "RMON's ability to give us baseline and historical data for each segment could give us the edge we need in these situations."

USERS REACT

Users agree that the vendors are taking the right direction, but they also realize there is still a ways to go. Finding a comprehensive network management tool that can handle systems from personal computers to SNA environments is the desire of David Dang, systems development specialist for Los Angeles County

Continued on page 66

DMI to play pivotal role in unifying system, net mgmt.

Network managers' prayers for a unified view of their networks and the systems attached to them are seemingly about to be answered. The recently developed Desktop Management Interface (DMI) is already being hailed as a significant milestone in bringing control of desktop systems into the network management fold.

Created by the Desktop Management Task Force (DMTF), DMI defines a set of standard interfaces that will make it possible for vendors to add systems management capabilities to a net management platform. The DMTF, a multivendor consortium, is also developing standards for managing servers, desktop systems-based applications and related peripherals such as printers and mass storage devices.

DMTF members started last April to deliver code based on the DMI specification. A DMI Software Developer Kit for DOS, Windows and OS/2 became available in August. The push is now on to get leading network management platform vendors to integrate DMI into their products.

The initial vendor and user response to DMI has been quite positive.

Both vendors as well as users are embracing DMI, saying it will do for personal computer desktop systems management what the Simple Network Management Protocol did for internetworking device management. SNMP delivers network management to certain elements of the network, such as bridges, routers and hubs, but each SNMP implementation requires a product-specific design.

"The objective of DMI is to reduce development efforts from a product-specific design to an implementation of industry-standard interfaces," says Pete Grillo, manager of systems management at Intel Corp., a DMTF charter member that played a key role in the development of DMI.

Desktop system and management platform vendors seem willing to buy into this cooperative effort to simplify and standardize desktop and network management.

A number of vendors, including AST Research, Inc., Digital Equipment Corp., Hewlett-Packard Co., IBM, Intel Corp., Microsoft Corp., Novell, Inc., SunSoft, Inc. and SynOptics Communications, Inc., have announced desktop systems or management platforms that currently support DMI or will support it within the next several months.

"The major SNMP console vendors are committed to providing DMI support and are currently working on incorporating it into their products," says Shannon Gray-Voigt, architecture standards marketing manager at Intel and DMTF chairwoman.

Intel's LANDesk Manager will support the DMI in its next release, Version 2.0, scheduled for availability by the end of this year. Intel's LANDesk Manager product is compatible with both Novell's NetWare Management System and HP's HP OpenView network management platforms.

"From the network management platform side, DMI may be viewed as an instrumentation interface," according to Joe Matibag, senior product manager at SunSoft, which plans to bundle DMI with an SNMP agent.

Most workstation vendors will bundle DMI with their operating systems and make use of a translation capability that converts DMI Management Information Format files to an SNMP Management Information Base format.

The DMTF was founded in 1992 by DEC, HP, IBM, Intel, Microsoft, SunConnect (now SunSoft) and SynOptics.

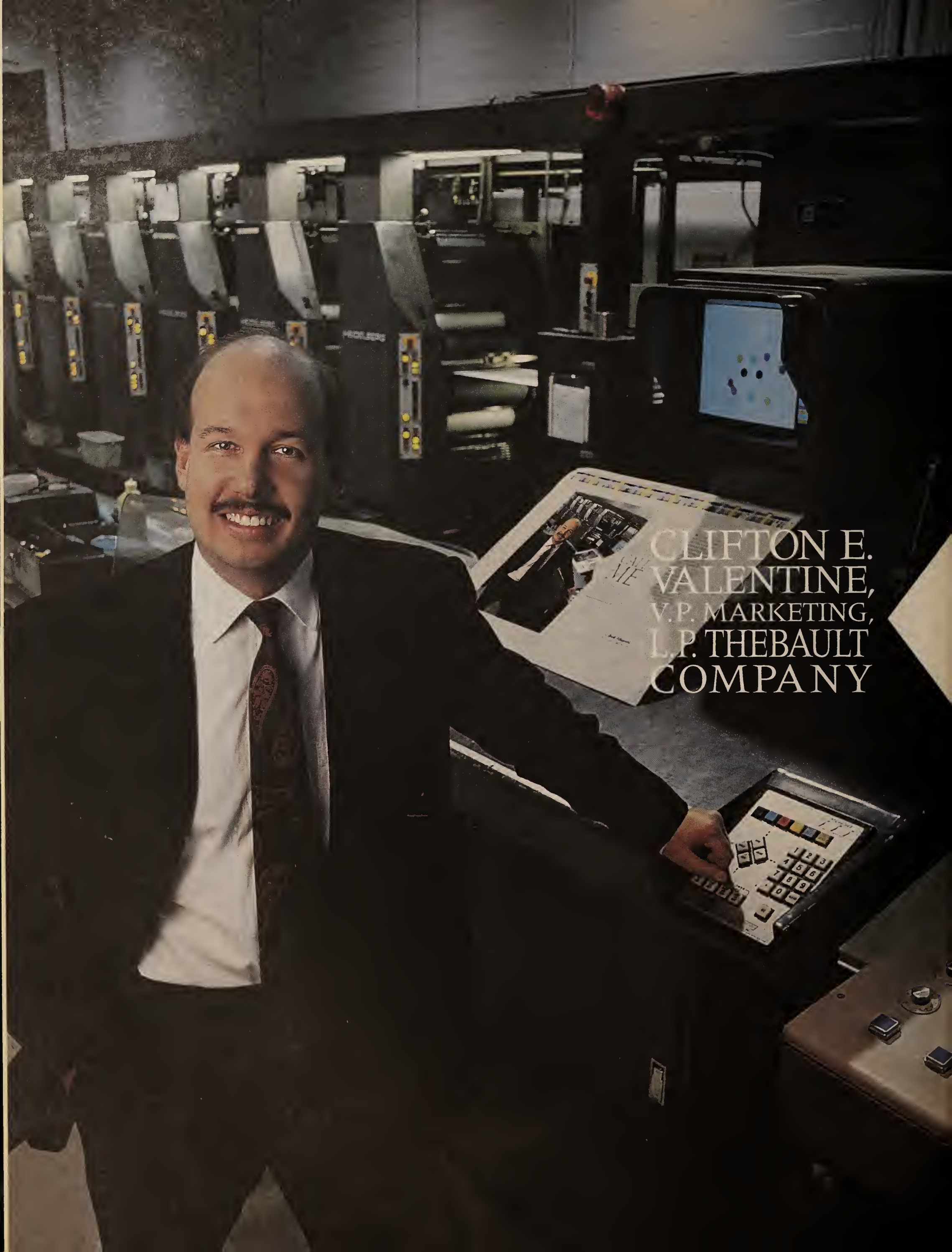
At the present time, the DMTF touts more than 300 member organizations, including network management platform vendors such as HP, IBM and Sun.

DMI architectural overview

The DMI has these key elements:

- A Component Interface (CI) that forwards data from managed systems to a Management Interface (MI) on the management platform.
- A Management Information Format (MIF) database that stores data from managed systems.
- A Service Layer that controls the flow of data among the MI, the CI and the MIF database.

A more detailed DMI description will be the focus of an "In a Nutshell" article in the Oct. 31 issue.


CLIFTON E.
VALENTINE,
V.P. MARKETING,
L.P. THEBAULT
COMPANY

BELL ATLANTIC'S DATA SOLUTIONS CAN GET YOUR BUSINESS ROLLING FASTER, TOO.

CALL ME

1-800-723-4501

I'LL SHOW YOU THE PROOF.

We're L. P. Thebault Company, a large, prominent commercial printer with clients ranking among the most exacting and respected businesses, agencies and design firms worldwide. Like everyone these days, we operate under tight deadlines. We often rely on overnight couriers to deliver pre-press layouts to our clients for approval, or we send the layouts via modem—a process which can take hours, depending on the complexity of the graphics. Client revisions add days or weeks to the schedule and drive up production costs. Acting as our technical partner, Bell Atlantic* recommended SMDS as a way to shave critical time from the approval process. With SMDS, we can electronically transmit layouts and incorporate client changes within *minutes*. This saves our clients—and us—significant time and money. And this kind of customer service edge keeps our clients coming back. Bell Atlantic proposed a turnkey solution with training support and network integration ideas that minimized our initial investment. Right now, we're installing SMDS lines for some of our biggest clients and looking to link to other clients across the nation. If your business is looking to increase productivity too, call me. I'll give you the layout on Bell Atlantic.

Bell Atlantic
THE HEART OF COMMUNICATION℠

Callers will hear a recorded message from Mr. Valentine, and will be given the opportunity to leave a message for him or to speak with a Bell Atlantic representative. *Service provided by the Bell Atlantic operating telephone companies. © 1994 Bell Atlantic.

Continued from page 63

in California. Dang's network management tools currently include IBM's host-based NetView, Cabletron's Remote LANView and SunSoft's SunNet Manager.

"Unfortunately, we have not found a system that can manage PCs, [Network Basic I/O System] applications, TCP/IP workstations and SNA mainframes from a single console," Dang says. This lack of cohesiveness brings about other challenges, such as operator training. "When you have several types of network management systems and you do not use them on a daily basis, it is a challenge to stay familiar with all of the network management functions, commands and reporting options," he adds.

Other users agree. "We have not found any network management system, out of the box, that is scalable enough to handle the corporate, divisional, departmental and local network operations," says Martin Marietta's Belland. "And since networks of our magnitude are relatively scarce, the vendors do not have a great deal of experience in this area, either."

As a result, Belland has taken a proactive approach to work with the vendors as a member of HP's OpenView Forum. "When the vendors develop an open framework, into which the best-of-breed applications can be integrated, we will then have net management systems that meet the requirements of large enterprise internetworks," he says.

This is a shift from a few years ago when the platform choice was largely dictated by the applications that a platform could support. Users such as Tim Deger, network manager for Guarantee National Insurance Co., a property and casualty insurer in Denver, know this fact very well. Deger's selection of a network management platform was dictated by the applications it supported. Guarantee National's network includes 400 nodes in one location, connected by 3Com Corp. hubs and switches.

"At the time we were shopping, the management applications that supported our 3Com LinkBuilder Multi Services Hub and LANplex Ethernet switches were only available under SunNet Manager, and that factor, more than anything else, influenced our purchase decision," he says.

A secondary factor was the in-house expertise in Sun workstations that Deger had on his staff.

"Installing a network management system from scratch is not a trivial task, and experience with systems hardware, the operating system and a good knowledge of SNMP are all key ingredients for a successful implementation," Deger says.

As the network management market has matured, the applications vendors have ported their software to multiple platforms, making the shopping that much easier.

For instance, Network General Corp. has ported its Sniffer protocol analysis software to run on a number of platforms, including HP's OpenView, IBM's NetView/6000 and SunSoft's SunNet Manager.

Paul Franchois, computer specialist at the National Institute of Standards and Technology (NIST) in Boulder, Colo., appreciates such applications porting. Network operators managing NIST's network — which has 500 users spread across 13 Ethernet segments and WAN links to Gaithersburg, Md., and to the NSFNet — can now use SunSoft's SunNet Manager instead of Network General-specific consoles to analyze network problems.

"We have used stand-alone Sniffer analyzers for a number of years and were pleased to see this application linked with the SunNet Manager console," Franchois says.

Franchois has configured SunNet Manager to poll selected hosts on each segment every 5 minutes. This approach tests the reachability of hosts and confirms that packets are being properly routed. Hosts chosen for these tests are operational 24 hours a day. If one of the polls fails, SunNet Manager sends an alarm notification to the console and electronic mail to key personnel such as the operator of another segment.

For further analysis, the network operator can open the Sniffer window on the SunNet Manager console, access a remote Sniffer analyzer on the segment in question and diagnose the problem.

Other applications developers are following suit. "ISVs that have been playing a wait-and-see game, trying to determine which of the platforms will gather the strongest industry support, are now porting their applications to multiple systems," says Brandywine's Huntington-Lee.

For example, Cisco recently added OpenView and NetView/6000 support for its CiscoWorks router manager application. Concord Communications, Inc.'s Trakker traffic analysis tool was recently ported to OpenView, with a promise for future NetView/6000 support. Both these applications previously ran only on SunNet Manager.

It appears that HP and IBM customers will be the winners as more vendors rush to develop applications for those vendors' platforms (see Figure 3).

Net management applications from both platform makers and ISVs fall into one of eight categories, according to Huntington-Lee (see Figure 4, page 68). The hottest applications include trouble-ticket management, device tracking and traffic monitoring, she says.

Data analysis applications are joining that list as network managers look for help with crunching all the data that the net management platform collects.

"Most managers are overloaded with the amount of data that an enterprise management platform can generate," Huntington-Lee says. "What the end user needs is a way to distill that information into some meaningful charts and reports that show the key trends."

SYSTEMATIC MANAGEMENT

But things are about to change. "The emerging trend among platform vendors is to include more traditional systems management applications such as performance monitoring, hardware inventory or software distribution," Huntington-Lee says.

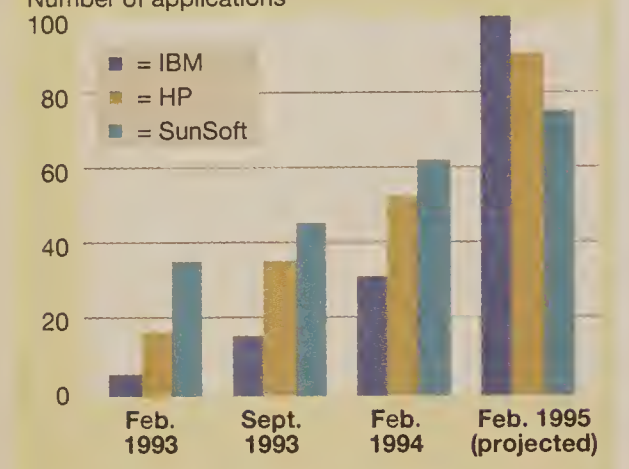
To accomplish this goal, strategic alliances have been struck between platform and appli-

Continued on page 68

IBM, HP eclipsing SunSoft

Figure 3

Growth in third-party applications



IBM and Hewlett-Packard Co. are well on their way to outpacing SunSoft, Inc. in the number of third-party applications that will run on their respective network management platforms.

SOURCE: FAULKNER INFORMATION SERVICES, PENNSAUKEN, N.J.
GRAPHIC BY SUSAN SLATER

Step up to the MIC

Users can influence the development of standards for tightly integrating applications with platforms and for making applications portable across platforms by joining the Management Integration Consortium (MIC). For information, send E-mail to mic-info@www.peregrine.com or contact MIC Secretary Jim Corrigan at (410) 290-0355.

Firm selects platform with long-term view

Selecting the optimum network management platform was a four-month process for technical staff members at Black & Veatch, an engineering and construction firm headquartered in Kansas City, Mo.

Black & Veatch's global network of 6,500 nodes consists of 13 worldwide project sites, 33 U.S. offices and a corporate headquarters spread across nine buildings in Kansas City. While the current network infrastructure supported the company's global computing needs nicely, the firm took into account strategic planning for its next-generation computing needs when selecting an enterprise network management platform.

The search began last spring when the firm's Information Systems Committee chartered three task forces to investigate next-generation local and wide-area technologies to be implemented at Black & Veatch. One task force focused specifically on projected LAN and WAN network management needs. Each task force included five or six network analysts from the various business units within Black & Veatch.

"We found the system cost to be a secondary issue because the turnkey prices for all four systems were in the same general ballpark once hardware, software and applications were considered."

Greg Moore, computer network manager at the firm, chaired the Network Management Task Force, which included members from the Power Plant, Transmission and Distribution and Environmental Engineering departments.

Moore says his committee knew that the Simple Network Management Protocol, not the ISO's Common Management Information Protocol or some proprietary scheme was the answer to the big picture.

"We then had to determine which vendor's platform would best suit our requirements," he adds.

With SNMP a given, task force members identified further key product selection criteria, such as application integration, support for distributed consoles and strong evidence of local vendor expertise and support capabilities. Based on their selection criteria, previous vendor relationships, published product reviews and recommendations from an independent consultant, the task force identified four vendor candidates.

Black & Veatch's short list included Cabletron System, Inc.'s Spectrum, Hewlett-Packard Co.'s HP OpenView, IBM's NetView/6000 and SunSoft, Inc.'s SunNet Manager. The task force invited each vendor to make product presentations and leave its systems in Black & Veatch's test lab for a four- to eight-week hands-on evaluation.

During the evaluation process, two or three different systems were operating simultaneously, which allowed the Black & Veatch staff to make side-by-side comparisons of each product's strengths and weaknesses.

"During the hands-on evaluation, we focused on each system's accuracy in discovering the topology of our network plus its ease of use," Moore says. Another factor that played into the purchase decision was the overall product direction, which was supplied to Black & Veatch under nondisclosure agreements.

"We found the system cost to be a secondary issue because the turnkey prices for all four systems were in the same general ballpark once hardware, software and applications were considered," Moore says.

The evaluation team found Spectrum's client/server architecture and artificial intelligence a plus but discovered the product lacking in depth and breadth of third-party applications.

NetView/6000's automated scripting functions, implemented via tool bars, were easy to use and configure, but the product fell short in the quality of local support.

SunNet Manager was found to be a mature product with an intuitive user interface that made it the easiest to use of all those tested. The downside in going with SunNet Manager was Black & Veatch's perception that the vendor lacked a future product direction strategy.

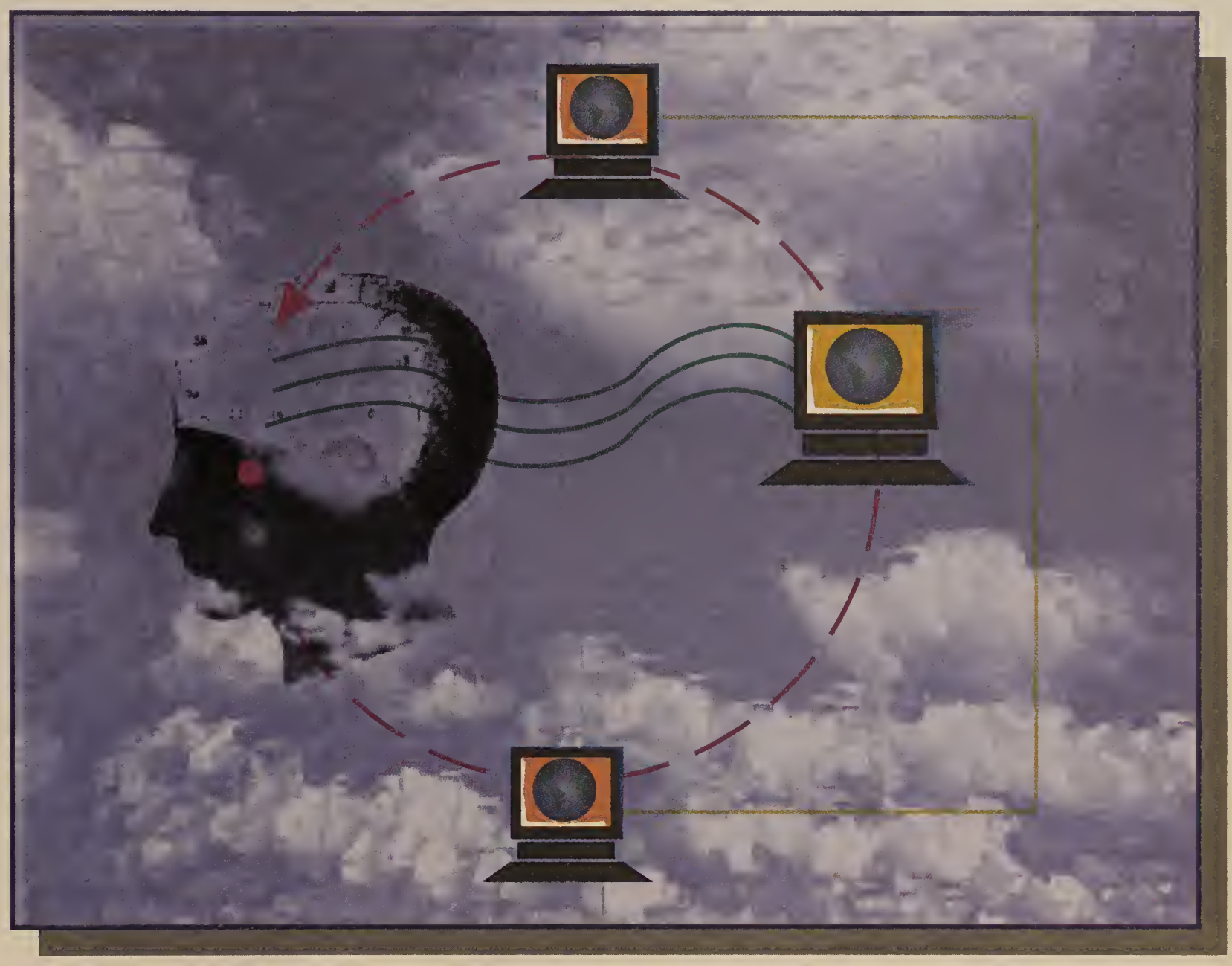
This left HP's OpenView as the winner. In addition to most closely matching the company's originally established requirements, Black & Veatch was very pleased with OpenView's level of third-party application integration.

Now that the initial giant steps of network management platform evaluation, selection and purchase have been taken, Moore and his group are waiting to see if HP delivers on promised product enhancements.

"We are anxious to see the next release and have an interest in HP's future plans for distributed consoles and database enhancements that allow information sharing between various applications," Moore says.

DATABASE CLIENT/SERVER WORLD

WHERE KNOWLEDGE MEANS SUCCESS



CONFERENCE AND EXPOSITION

Chicago, IL • December 7-9, 1994

Conference Chairman
George Schussel

Plenary Session
Steve Jobs

Special Keynote Session
Steve Mills

Over 200 World-Renowned Experts

Co-Sponsors
Client/Server Computing
Computerworld
Client/Server Journal
Cognos, Incorporated
Computer Associates International, Inc.
Data Based Advisor
Database Programming & Design
Data Management Review
DBMS
Gupta Corporation
IBM
Information Builders
Intel
JYACC
KnowledgeWare
LBMS
Network World
Novell
Open Systems Today
Oracle
Powersoft
Trinzic
Uniface

10 In-Depth Conferences

- Client/Server Tools and Application Development
- Object-Oriented Technologies
- Databases and Servers
- Data & Object Modeling
- Data Warehouse & Repositories
- Enterprise Database Connectivity
- Vertical Client/Server Applications
- Notes Conference *(Sponsored by Lotus)*
- Help Desk
- Windows Developers Summit

Call (508) 470-3880 to Register or to Receive More Information.
As an added bonus mention Code 4038W and receive your free copy of *Replication: The Next Generation of Distributed Database Technology.*

Sponsored by: DCI

DWAWN02

Continued from page 66

cations vendors. For example, Austin, Texas-based Tivoli Systems, Inc.'s suite of Unix systems management tools will be linked with HP's OpenView, IBM's NetView/6000, SunSoft's SunNet Manager, Novell's NetWare Management System (NMS) and Microsoft Corp.'s Systems Management Server (SMS), which was formerly called Hermes. LEGENT Corp.'s AgentWorks family of systems management tools will integrate with OpenView, SunNet Manager and NetView for AIX.

"Network management, which has traditionally dealt with the communications infrastructure, must be extended into the systems management arena," says HP's MacKinney. "Systems configuration, server operation and overall systems performance are among the issues that need to be addressed in a comprehensive management system."

This new focus on systems management is positioning SNMP-based platforms to encroach on the once-sacred ground of host-based management frameworks. While SNMP-based network management deals with monitoring and controlling the operation of cables, hubs and routers, host-based management tools deal with such functions as user administration, passwords, software distribution and updates, as well as data backup and restoral.

Host-based management frameworks provide an underlying technology that enables multiple systems management applications to coexist, share a common user interface and exchange information. In some cases, a framework vendor may supply the integrating infrastructure, the applications that run on that infrastructure or both.

While these frameworks were originally designed to run on hosts, they are now being ported to client/server environments. Examples include Mainview from Boole & Babbage, Inc. of San Jose, Calif., CA-Unicenter from Computer Associates International, Inc. of Islandia, N.Y., and the Tivoli Management Environment from Tivoli.

In many cases, these frameworks are also being expanded with hooks that make it possible for them to be integrated with a net management platform.

For example, Tivoli's Enterprise Console is a rules-based application that provides a centralized point to receive, process and respond to events and alarms from network devices, systems, databases and applications.

Tivoli's product collects, collates and responds to events that can originate in OpenView, SunNet Manager, NetView/6000, NMS or SMS. When an event arrives, it is processed and a response that automatically corrects the problem is issued.

While systems and network management are two distinct operations, the integration of these technologies can bring great synergies, says Jack Leifel, director of IT services at Motorola, Inc. in Arlington Heights, Ill. His group has designed a three-prong approach that includes Cabletron's Spectrum, Tivoli's Tivoli Management Environment, plus Remedy's Action Request System trouble-ticket database.

"We are looking to these three products to provide very different functions," Leifel says. "We are using Spectrum to control our routers and any other SNMP-manageable device. Tivoli's system manages the servers within the network, and the Remedy software keeps track of our open trouble calls. We are currently working with the vendors to provide a tighter integration between these elements so we can be advised of any network or systems problem before our customers are aware it."

FUTURE MANAGEMENT MODELS

Networks are growing in both size and complexity, and management systems are driving hard to keep up. In the future, look for more distributed architectures, extended openness and a greater number of published APIs that will enable the sharing of database information.

"We will have an interesting year in the platform wars," explains McConnell Consulting's McConnell. "But the major issue will deal with intertool integration. Users need to integrate their monitoring, trouble-ticket reporting, inventory and other functions, and the vendors that provide a comprehensive solution will come out on top."

With all the alliances being struck between platform vendors and between platform and applications vendors, the tour of the marketplace is bound to be an interesting one.

Miller is a contributing editor and president of DigiNet Corp., a Denver-based data communication engineering firm. He's authored seven books on LAN and WAN technologies, including *Managing Internetworks with SNMP*, and can be reached via the Internet at mark@diginet.com.

Management applications by category

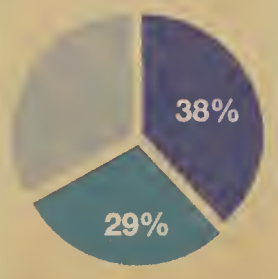
Figure 4

Net management applications fall into one of eight categories:

1. Device-specific applications used to manage such products as routers, hubs and switches.
2. Platform extensions that provide value-added functionality such as forwarding management alerts to pagers.
3. Tools that manage performance of networked Unix systems.
4. Process-specific applications that include trouble-ticket tracking and data analysis.
5. Traffic monitors and analyzers that can track and decode packets riding across LAN and WAN links.
6. Development tools that enable end users to write custom applications.
7. Service-specific applications that enable users to manage carrier-provided services.
8. PC management applications that forward alerts to a central console and track hardware or software inventory.

SOURCE: FAULKNER INFORMATION SERVICES, PENNSAUKEN, N.J.

Managing networked systems accounts for 38% of the cost for a client/server environment, the largest single outlay by far. End-user labor costs are the next highest expenditure, chewing up 29% of the outlay.



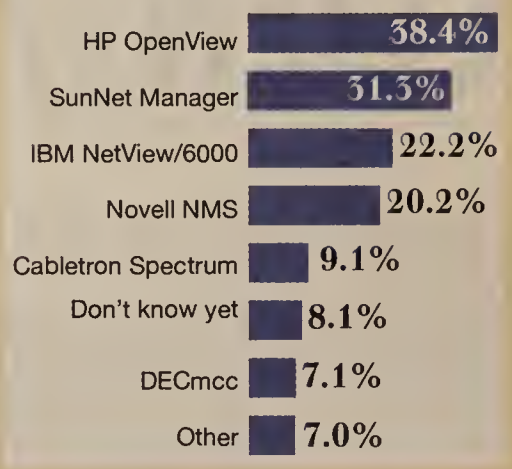
SOURCE: GARTNER GROUP, STAMFORD, CONN.

Reader views on network management platforms

Based on 100 interviews.

Which of the following network management platforms are you/will you be evaluating?

(Multiple responses allowed.)



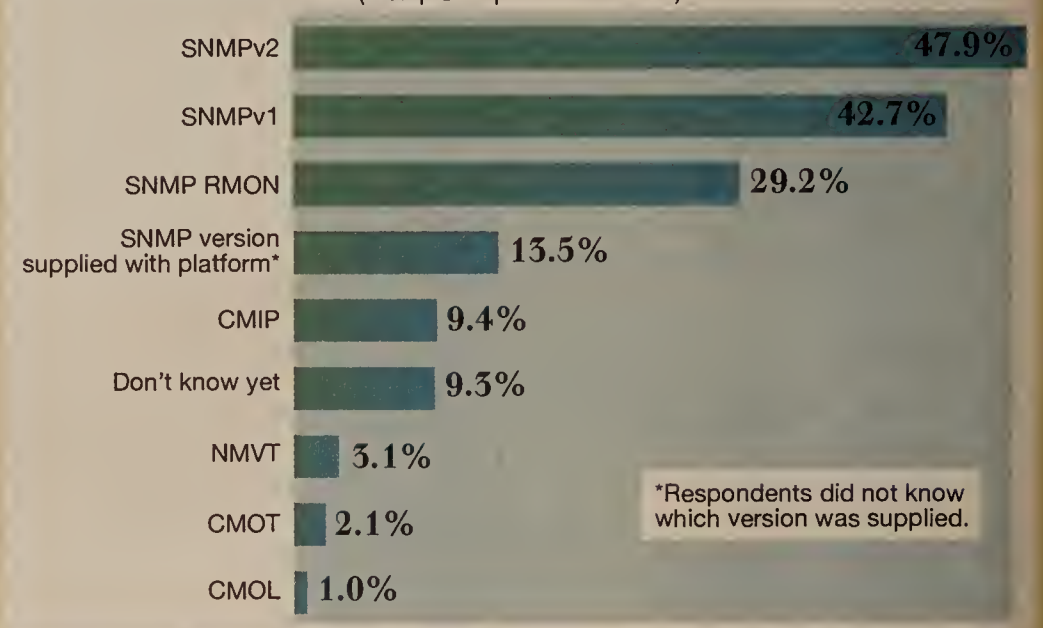
What is the most important criterion when selecting a network management platform?

Based on highest possible score of 6.

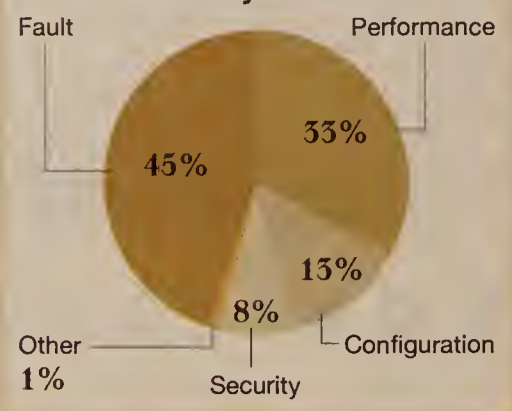
Conformance to a standard management environment	4.77
Level of integration among platform-based applications	4.03
The range of bundled core management applications	3.62
Interoperability with other network management systems	3.43
Management distribution features	2.78
Availability of third-party element management applications	2.56

Which management protocols do you/will you require your network management platform to support?

(Multiple responses allowed.)



Which network management function is the area of greatest concern for your network?



Key service and support issues

Based on highest possible score of 6.

Maintenance/upgrade programs	3.90
Integration services	3.82
Ease of installation	3.52
Remote diagnostic capabilities	3.44
Next-day availability of parts	3.32
Toll-free hot line	3.14

What are the issues you wrestle with most concerning network management platforms?

"Their ability to work at the enterprise level rather than the local level. The HP OpenView [platform] I'm using can't be used at all sites."

"The level of integration with sharing of information among third-party applications."

"The lack of standards and interoperability between different management platforms."

"They're not intelligent. They just collect information, but they don't give solutions. They are difficult to install, and they are not stable."

"My only criterion is a single framework to manage the whole environment — systems and network — and there are no systems/network management platforms available."

Focus Data, Inc., an independent market research firm in Framingham, Mass., conducted this survey. Focus Data specializes in gathering primary data from end-user organizations regarding their enterprise network environment and needs. For more information on Focus Data services, call Mona Dabbon at (508) 626-2556.

GRAPHIC BY SUSAN SLATER

Go With The Flow!

SNA Users, Get Excited! We'll Take You Through The Rapid Changes In ATM Technology At One Of Our FREE Seminars.

Those who successfully navigate through all the confusion around ATM will find themselves riding the crest of the wave of the future.

Get Your Feet Wet!

Cascade Communications is proud to present an in-depth technical seminar that's the perfect vehicle.

This half-day seminar is designed to provide you with strategies that will guide your computer and network planning for the rest of the decade. Get the answers you need.

In just a few hours, you'll find out how to:

Predict what your network will look like in five years, with ATM equipment on-premises and ATM public and private networks in place.

Identify which approach for reconciling SNA and LAN activity makes business sense for your company.

Don't miss the boat!
Call 1-800-379-1481 and sign up for a seminar near you.

Seminar Dates and Locations:

Oct. 25 - Los Angeles	Nov. 2 - Chicago
Oct. 26 - San Francisco	Nov. 3 - New York City
Oct. 27 - Bellevue, WA	Nov. 8 - Washington, DC
Nov. 1 - Detroit	Nov. 9 - Toronto
	Nov. 10 - Atlanta

Justify your network evolution in terms of ROI, tariff arbitrage, and traffic consolidation.

In addition, you'll have an opportunity to talk with the presenters to discuss your specific situation and explore what the future holds in store.

Whether you want to test the waters, or plunge right into ATM, this is for you.

Your guide is world-recognized network consultant, contributing editor to *Network World*, and ATM wizard, Tom Nolle. He'll show you how to steer clear of danger, keep your head up for any challenge, and successfully implement this exciting technology.

CASCADE

Creating The Natural Flow Of Information.

Cascade Communications Corp., 5 Carlisle Road, Westford, MA 01886 • (508) 692-2600

MARKETPLACE — The Hub of the Network Buy

Two Ways to Receive Free Information

Reader Service

Use this coupon or prepaid post card in the October 3rd and October 31st issues. Circle Reader Service numbers of ads that interest you and complete the information below.

Expires 1/31/95

Name: _____
Title: _____
Company: _____
Phone: ( ) _____
Street: _____
City: _____
State: _____ Zip: _____

208	209	210	211	212	213
214	215	216	217	218	219
220	221	222	223	224	225
226	227	228	229	230	231
232	233	234	235	236	237
238	239	240	241	242	243
244	245	246	247	248	249
250	251	252	253	254	255
256	257	258	259	260	261

Mail to: NW P.O. Box 5090, Pittsfield, MA 01203 or,
Fax to: NW at (413) 637-4343 *10/17/94*

FaxNET

Here's how it works:

- Dial **1-800-664-8271** on your touch tone phone.
- Wait for the prompt and follow instructions.
- Key in advertisers' 5 Digit Number.
- Information requested will be faxed to you immediately.

CYBEX CORPORATION	30210
DISTINCT CORPORATION	30100
FIREFOX	30340
FRONTIER TECHNOLOGIES	34260
FTP SOFTWARE	30440
NETWORK APPLICATION TECH	30160
PAIRGAIN TECHNOLOGIES	30330
PROCOM TECHNOLOGY	30320
SECURE COMPUTING CORPORATION	30360
TELCO SYSTEMS/MAGNALINK	30240
UB NETWORKS	30350
WEST HILLS LAN SYSTEMS	30410

There is no cost to you to receive information on these network products and services!

Handcuff the Hackers. Secure Your Connection to the Internet.

SIDEWINDER SECURITY THAT STRIKES BACK™

Introducing Sidewinder™ – The Intelligent Choice for Worry-Free Internet Security. To safely contend with the increasing threats posed by the public Internet, Secure Computing Corporation has developed ***Sidewinder***, a seamless and secure inter-networking solution for business and industry. This breakthrough technology not only prevents unauthorized access to your network ... but it actually traps intruders! All of which means you can now join the Internet ... with peace of mind.

Unrivaled Points of Difference That Go Beyond Reliable Security and Peace of Mind. Secure Computing Corporation has a long history of supporting the U.S. Government's Department of Defense and other agencies in developing high-grade computer security systems. Based on our proven technology, we're proud to offer a family of products to business and industry that allows worry-free sharing of data between networks. For more information on ***Sidewinder*** or how we can help you secure your network environment, call us today at (800) 692-LOCK.

Secure Computing Corporation

2675 Long Lake Road
Roseville, MN 55113 U.S.A.
Phone: (612) 628-2700
Toll Free: (800) 692-LOCK
Fax: (612) 628-2701

*© October 1994 Secure Computing Corporation. All rights reserved. **Sidewinder** includes software developed by the University of California, Berkeley, and its contributors (including Carnegie Mellon University).*

Circle Reader Service No. 255

SNMPc Network Manager

Only $495

- Node Discovery
- Navigation Tree
- Real Time Graphs, Charts
- Long Term Statistics
- Event Action Filters
- Health Meters/Thresholds
- MIB Compiler
- MIB Table Display/Edit
- Generic Hub Display
- DDE API Interface

1-800-331-SNMP

Castle Rock Computing

Phone (408) 366-6540 Fax (408) 252-2379

20863 Stevens Creek Blvd. Suite 530 Cupertino, CA 95014

Circle Reader Service No. 252

GLOBAL ACHIEVEMENTS

FRONTIER TECHNOLOGIES NEW SUPERTCP/NFS FOR WINDOWS

- **Best set of network applications**
  "SuperTCP/NFS totes one of the best arsenals of TCP/IP weaponry available." *-PC WEEK 3/94*
- **Best user buy of any TCP/IP**
  "Frontier's SuperTCP/NFS for Windows represents the best user buy of all the TCP/IP software packages that were tested." *-Communications Week 7/4/94*
- **Easy to configure**
  "Configuration is a breeze using the SetupTCP program . . . telnet implementation is outstanding." *-PC Magazine 6/28/94*
- **High performance plus easy installation and use**
  "Of all the packages we tested, Frontier's SuperTCP for Windows offered the best mix of performance and ease of installation and use." *-Data Communications Magazine 2/94*

The experts unanimously agree that Frontier's SuperTCP/NFS for Windows outclasses all other TCP/IP products. In addition to being **the first 32-Bit VxD TCP/IP, NFS, NetBIOS product that requires zero DOS memory,** SuperTCP/NFS offers an **incredibly complete and robust set of network applications** including MIME Email, Telnet, Internet News Reader and more.

Call Frontier Technologies today to order our **award winning** SuperTCP/NFS for Windows.

FAX 414-241-7084 | **CALL** 414-241-4555 | **EMAIL** tcp@frontiertech.com | **BBS** 414-241-7083

Frontier Technologies Corporation, 10201 N. Port Washington Road, Mequon WI 53092

Frontier Technologies Corporation

The Technology Leader In Network Applications

© 1994 Frontier Technologies Corp. All Rights Reserved.

Plug-n-Play CD Towers

Check out what Procom Technology's CD Tower Series has to offer:

- Connect up to 49 CD–ROM drives to a single SCSI host adapter for 29 gigabytes of on-line data; or connect a CD Tower-Ethernet subsystem to your office network for the easiest installation possible
- Simple plug-n-play installation eliminates network down-time
- SCSI and Ethernet connectivity
- Compatible with all popular networks including Novell NetWare, OS/2, Windows NT, Windows for Workgroups, or DOS
- 2x, 3x, and 4x high-performance CD–ROM drives
- All hardware and software necessary for the installation
- CD–ROM management software (optional)
- 4, 7, 14, 21, or 42-drive configurations
- Professional technical support and sales team
- Toll-free technical support number
- One year warranty

For a local Procom Technology reseller near you, call today.

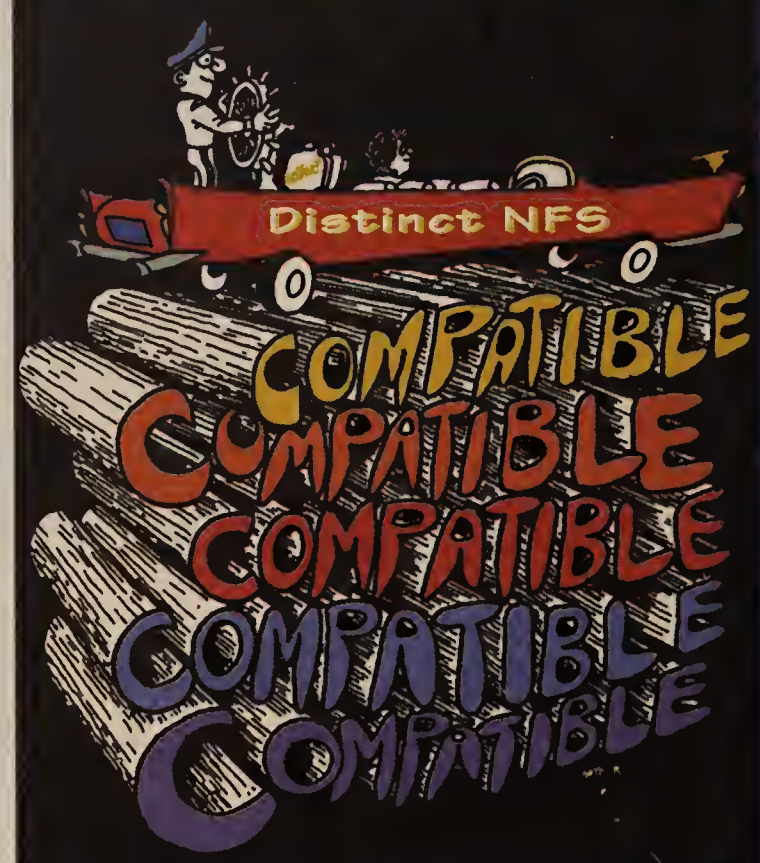
Procom Technology, Inc.
2181 Dupont Drive; Irvine, California 92715
TEL: 714.852.1000 x.414 or 800.800.8600 x.414

©1994 Procom Technology, Inc. All rights reserved.

yes It runs with NetWare

Circle Reader Service No. 233

Distinct® NFS



Runs over Distinct® TCP/IP, Microsoft® TCP/IP and Novell® LAN Workplace

- Allows files and printer sharing across multiple platforms
- Works in Windows™, Windows for Workgroups and DOS boxes
- Implemented as a VXD
- Client and server
- Includes Windows Sockets

distinct®
Email:mktg@distinct.com
Fastfacts: 408.366.2101
Fax: 408.366.0153
Phone: 408.366.8933

Circle Reader Service No. 209

Server-based TCP/IP for NetWare® Clients

yes NetWare Tested and Approved

Free 30-Day Trial

NOVIX®

TCP/IP resides on your NetWare Server.

Right on Target FIREFOX

Control communications for up to 1,000 nodes.
Call 800-230-6090 or 408–321–8344 for more information, **today**.

Circle Reader Service No. 243

SUPER DISCOUNTS ON NAME BRANDS

THOMAS◆CONRAD CORPORATION · SMC · 3Com · intel · SynOptics · Xircom

ETHERNET HUBS

Stand alone Hubs

8 Port 10BT Hub, BNC	$160
8 Port 10BT Hub, BNC & AUI Ports	$180
9 Port 10 BT Palm Hub	$175
12 Port 10BT Hub, BNC & AUI ports	$320
16 Port 10BT Hub, BNC	$280
16 Port 10BT Hub, BNC & AUI Ports	$380
6 Port Hub, Fiber Optic Ports SNMP Controlled	$1249
8 Port Hub, BNC SNMP Controlled	$899

Stackable Hubs

Basic Hub 12 10BT+2AUI+1BNC	$599
SNMP Controlled Hub 12 10BT+2 AUI+1 BNC	$795
SNMP Master Hub	$995

TRANSCEIVERS

AUI to TP	$39
AUI to BNC	$39
AUI to Fiber Optic	$220

POCKET LAN ADAPTERS

Pocket Ether TP+BNC	$99
PCMCIA IC Lan Card BNC or UTP	**$170**

NEW

REPEATERS

Ether 2 : 2 BNC+2 AUI Ports	$185
Ether 4 : 4 BNC+4 AUI Ports	$310
Ether 6 : 6 BNC+1 AUI Ports	$430

RAID SOLUTIONS

MICROPΩLIS

RAIDON LT 1120 Disk Array Kit with Novell configuration kit	$4495
RAIDON LT 2100 Disk Array with Novell configuration kit	$5595

TAPE BACKUP SYSTEMS

COLORADO MEMORY SYSTEMS

Jumbo 250 DJ-20 Int.	$182
Power Tape 2Gb SCSI W/control Internal/External	$1045/1199
Power Tape 4Gb SCSI W/control Internal/External	$1620/1830

NETWORK SOFTWARE

NOVELL NetWare

NetWare Lite V1.1		$53
- V2.2	5/10 User	$469/1049
- V2.2	50 User	$2079
- V3.12	5/10 User	$599/1299
- V3.12	25/50 User	$1895/2519
- V4.01	5 User - CD ROM	$899
- V4.01	10 User - CD ROM	$2025
- V4.01	25 User - CD ROM	$2975
- V4.01	50 User - CD ROM	$3599
- SFT3 V3.11	5/10 User	$1610/2500
- SFT3 V3.11	25/50 User	$3326/4825
- SFT3 V3.11	100/250 User	$6928/11968
NetWare Multiprotocol Router		$640
NetWare Multiprotocol Router Plus		$960
NetWare Connect 2 Port		$380
NetWare Connect 8 Port		$1400
NetWare Video Server	5 User	$950
NetWare Video Server	10 User	$1495

Call for Upgrades

ARTISOFT

LANtastic/AI 6.0 Win Single	$76
LANtastic/AI 6.0 Win 6 Pack	$509
LANtastic/AI 6.0 Win 12 Pack	$978
LANtastic/AI 6.0 DOS Single	$68
LANtastic/AI 6.0 DOS 6 Pack	$430
AE-2 16 Bit Ethernet Adapter	$199
16 Bit LANtastic Compatible Adapter	$50

ETHERNET ADAPTERS

Intel Ether Express 16 BNC	$65
3Com Etherlink III 10BT 5/20 Pack	$104 $495/1799
Eagle Etherxpert-16 TP, (5 Pack)	$375
Ether-16T TP - Jumperless, NE-2000 Comp.Novell Approved	**$37**
Ether-16C Coax - Jumperless, NE-2000 Comp.Novell Approved	**$37**
Ether-16CT BNC+TP - Jumperless, NE-2000 Comp.Novell Approved	**$41**
Ether-32CTA Combo, 32Bit EISA	$199
4 Ports Internal Repeater TP+BNC	$159
4 Port Expansion card	$59
Vesa LocalBus Ethernet adapter	**$99**
PCI Ethernet adapter	**$99**

100 Mb/s Fast Ethernet

Compatible with cat. 3 or higher existing 4 Twisted Pair Cable RJ45 Connectors, Novell Certified	
Ether-100-ISA Adapter	$189
Ether-100-EISA Adapter	$315
8 Port Concentrator	$720
2 Port Repeater	$352

LOCAL & REMOTE BRIDGES

Local Bridge	$599
Local Bridge with SNMP	$1395
Remote Bridge with SNMP up to 64Kbps	$1595
Remote Bridge with SNMP up to 2.048Mbps	$2195
Remote Compression Bridge high speed synch. data up to 256Kbps	$1795
Remote IP Router with Bridging Capabilities	$1595

gandalF

LANline 5242, ISDN Remote Bridge ISDN "U" Interface (Direct Connection to ISDN), 128 Kbps Throughput Plus 4:1 Compression	$799
LANline 5220, High performance Remote Bridge, Dual WAN Links, Data Compression upto 8:1, Throughput of upto 1,024 Mb/s using standard 64Kb/s digital circuits	$1700
LANline 5210 Micro Ethernet Bridge	$349
5240/5220 Optimizer	CALL
Gandalf Central Site Concentrator	CALL

PRINT SERVERS

West Hills PrintMate 3000 2 Parallel Ports, 1 Serial Port BNC, AUI and RJ45 Connection 2 Year Warranty	$299 yes
Castelle Lanpress2P2S BNC or RJ45	$525
Intel Netport BNC or RJ45	$439
Eagle NPE 400 Pocket Server	$370

NEW

PCI Ethernet Adapter $99

ETHERNET SWITCHES

NBASE SWITCH COMMUNICATIONS

NEW

Ethernet 10Base switch
- 4 10Base-T and/or AUI Ports
- Flow control
- Full Duplex 20 Mbps — $2599
- 500,000 pps Engine
- Full Broadcast capability
- Multiple simultanous connections
- Near zero port-to-port switching delay
- Fully IEEE 802.3 Compliant

Kalpana

EtherSwitch
- High performance EtherSwitch Technology
- Five 10Base-T Ports
- 50 Mbps Bandwidth
- 20 Mbps throughput
- Plug'n play — $1599
- Self learning of Network Configuration
- Near zero port-to-port switching delay
- Fully IEEE 802.3 Compliant

NEW

STARTER KITS

Easy to use starter Kits let you create networks from 2 to 10 users

NOVELL PERSONAL NetWare

2 User Netware Starter KIT
- 2-Novell Personal NetWare
- 2-16 Bit Combo Adapter — $190
- 1-25FT. Length RG58A/U Coax
- 2-52 Ω Terminators

5 User Netware Starter KIT
- 1-Novell NetWare 5 User — Personal NetWare
- 5-16 Bit Combo Adapter
- 1-Crimp Tool — $490
- 10-BNC Connector — Novell 3.12
- 2-52Ω Terminator — $999
- 1-500 FT. Spool RG58A/U

100 Mbps Starter KIT
- 100 Mbps "Fast Ethernet" LAN Adapter and Novell DOS 7 in One Convenient Package
- LAN Adapter Bundle includes everything needed for "Fast Ethernet" Network Node — CALL

VISA & MASTERCARD

POLICIES...
30 day evaluation period from invoice date. Products must be returned in new condition with all manuals, boxes and material originally received.
Prices, specifications and availability subject to change without notice

Fast Delivery
Most Orders Ship
the Same Day

1-800-FOR-LANS
1-800-367-5267
For Technical Support call
1-818-773-8171
Fax: 1-818-773-8932

WEST HILLS LAN SYSTEMS
7949 Woodley Ave , Van Nuys , CA 91406

See The Future Of TCP/IP Without Leaving Your Desk.

Discover The Newest Windows Applications And Faster Network Access With TCP Pro.™

At last there's a TCP/IP protocol suite that delivers full support of the latest Windows™ applications, faster network and Internet access, multiplatform support, and more.

TCP Pro is a "tuned stack," allowing full wire-speed capability. Depending on your workstation, network and Internet access can be improved by as much as 200%.

TCP Pro, the first VxD on the market, supports the Windows Sockets (WinSock) interface so you can run the newest Windows applications. It also supports many other APIs, and all common PC and network operating systems, so you can keep existing applications while moving to the next generation.

Our Experience Makes It Simple.

UB Networks has more than 15 years experience in protocol development. We've installed over half a million TCP/IP nodes in networks around the world. That experience makes TCP Pro the best choice for your enterprise.

As low as $179.
call for details and a
Free Demo Disk
1-800-4-1-UBNET ext.601
or (408) 496-0111 fax (408) 970-7337

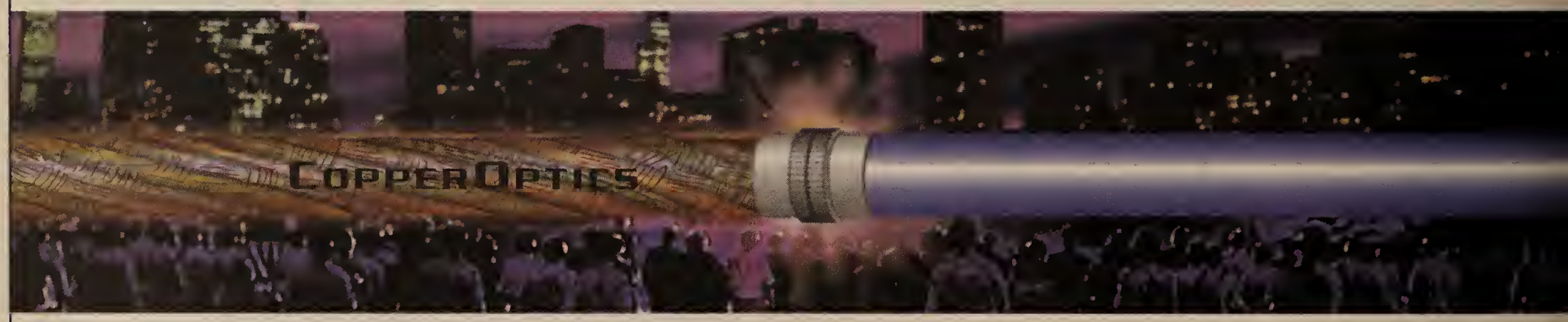
UB Networks
Formerly Ungermann-Bass®
Our Experience Makes It Simple.

World Headquarters: UB Networks, Inc., 3900 Freedom Circle, Santa Clara, CA 95054. Ungermann-Bass is a registered [illegible] is a trademark of Ungermann-Bass Networks, Inc. TCP Pro is a trademark of Network TeleSystems, Inc. All other trademarks are the property of their respective [illegible] Ungermann-Bass Networks, Inc. All rights reserved.

Circle Reader Service No. 226

INTRODUCING COPPEROPTICS™!

WHO SAYS YOUR "LAST MILE" T1/E1 CONNECTIONS CAN BE TRANSMITTED ON COPPER WITH FIBER QUALITY?



PAIRGAIN DOES!

CAMPUS-T1 and CAMPUS-E1 systems enable embedded, unconditioned copper pairs on your campus facility to transmit high-speed (1.544 or 2.048 Mbps) digital signals up to 5 miles without repeaters! The CAMPUS system provides transmission quality orders-of-magnitude better than repeatered copper and comparable to fiber (10^{-10} BER). It is ideal for T1 or E1 connections where fiber is not economical, and for extensions of fiber rings from a distribution point, i.e., the "last mile" access.

THE CAMPUS ADVANTAGE

- Highest Integration–VLSI @ 250 MIPS
- V.35, DSX-1, RS-449, G.703, RS-530
- Rapid and Easy Installation
- Network Management Interface

Providing a new twist in copper™

PAIRGAIN

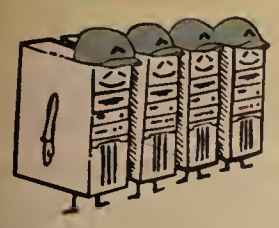
PairGain Technologies, Inc. • 12921 East 166th St., Cerritos, CA 90703 • (310) 404-8811 • Fax (310) 404-8939

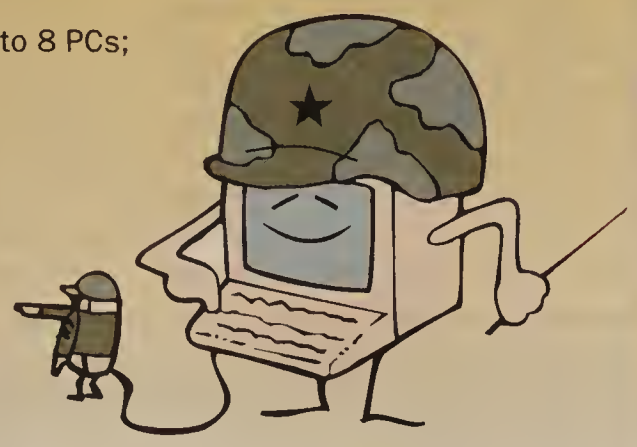
Circle Reader Service No. 241

AutoBoot Commander™

Control up to 96 file servers with just 1 keyboard, monitor and mouse!

- Supports all 100% IBM compatible computers
- AutoBoot™ feature boots computers without operator intervention
- New KeyScan™ feature for keyboard-controlled scanning
- Jumperless support for analog (VGA) and TTL video
- Add a second control center up to 150 feet away
- Each unit controls from 2 to 8 PCs; cascade up to 12 units





For Macintosh support, ask about our new Mediator™ for Macintosh!

Cybex Corporation
4912 Research Drive • Huntsville, AL 35805 USA
(205) 430-4000 • FAX (205) 430-4030

CYBEX™

IBM is a registered trademark of IBM Corporation. Macintosh is a registered trademark of Apple Computer, Inc.
Dealer Program Available **Made in USA**

Circle Reader Service No. 227

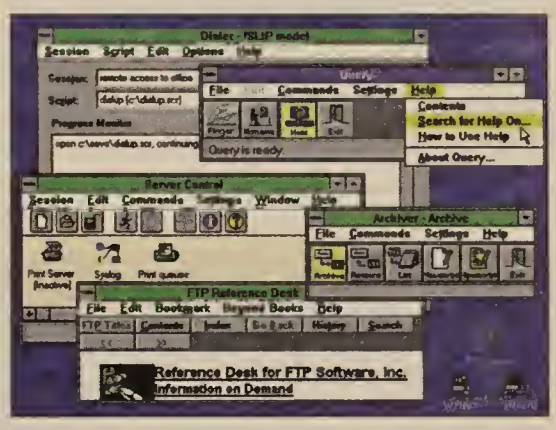
GO ANYWHERE, DO ANYTHING TCP/IP NETWORKING

New PC/TCP® OnNet™ 1.1

PC/TCP OnNet 1.1 for DOS/Windows delivers the best of both worlds—workgroup simplicity and enterprise functionality. Easy to install, administer, and use, PC/TCP OnNet's advanced applications and services extend the PC to the Internet and a whole new world of remote computing.

- Windows VxD-based 32-bit TCP/IP kernel and NFS
- Uses zero conventional memory
- 5-minute Windows installation
- New Windows Sockets applications
- Automated Windows serial line Dialer
- High performance DHCP client
- On-line documentation and help

PC/TCP OnNet enables the next generation of network communications, from wireless computing to multimedia and videoconferencing.



ftp Software®

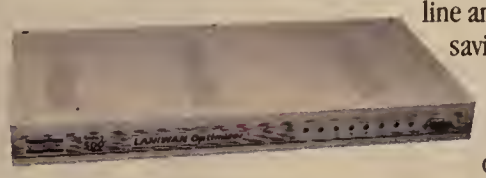
CALL (800) 282-4FTP, ext. 491 for more information.

FTP Software, Inc., 2 High St. North Andover, MA 01845 PC/TCP is a registered trademark and OnNet is a trademark of FTP Software, Inc.

Circle Reader Service No. 256

The Series 500C LAN/WAN Optimizer is a network data compressor that doubles the throughput of wide-area leased lines in Cisco router-based internetworks.

Designed for complete Cisco compatibility, the Series 500C incorporates Cisco Systems licensed software for full interoperability with all Cisco routers.



With easy installation, Telnet and SNMP management, and upgradability to the market-leading Series 5000 Optimizer product line, the Series 500C fuels WAN line and operating cost savings.

Call **1-800-474-8025** today to find out how to boost performance of your Cisco router networks.

TELCO SYSTEMS

Magnalink Communications Division
63 Nahatan Street • Norwood, MA 02062
Tel: 617 255-9400 Fax: 617 255-5885

© Copyright 1994, Telco Systems, Inc. All rights reserved. LAN/WAN Optimizer is a trademark of Telco Systems, Inc.

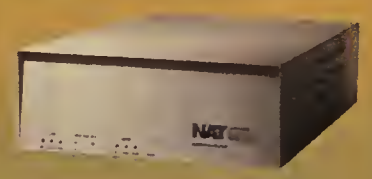
Circle Reader Service No. 213

N.A.T.'s Multiprotocol Router

now only $1495

Expands TCP/IP and Novell® NetWare® networks to multiple remote locations

Simple to install and operate
Remote console and TELNET support
SNMP agent
Bridging capability via PPP
Supports NetWare 3.1x and 4.x



Communications Week bridge/router rating

N.A.T. LANB/280 Bridge/IP Router	70
Vitalink/NSC 6602 bridge-router	69
3Com NetBuilder II bridge-router	66
Newbridge Ethernet Little Bridge	66
Proteon CNX 500 Bridging Router	57
Xyplex 3210 local bridge-router	54
Wellfleet Link Nobe bridge-router	47
ACC AC5 4200 bridge-router	43
Microcom MBR 6000 bridge-router	35

PRODUCT COMMUNICATIONS WEEK TESTING

call 1-800-474-7888

for a reseller nearest you, or for more information

For additional information on N.A.T.'s complete product line call our FAX Hotline at 1-800-776-8448

N A T
NETWORK APPLICATION TECHNOLOGY INC

yes NetWare Tested and Approved

Novell, NetWare, the Yes logo and the NetWare logotype are trademarks of Novell, Inc.

Circle Reader Service No. 208

Two Ways to Receive Free Information:

Reader Service

Use this coupon or prepaid post card in the October 3rd and October 31st issues. Circle reader service numbers of ads that interest you and complete the information below.

Mail to: Network World, PO Box 5090, Pittsfield, MA 01203 or FAX Network World at 413-637-4343

Expires 1/31/95

Name:_____
Title:_____
Company:_____
Phone ( )_____
Street:_____
City:_____
State:_____ Zip:_____
OCTOBER

109	110	111	112	113
114	115	116	117	118
119	120	121	122	123
124	125	126	127	128
129	130	131	132	133
134	135	136	137	138
139	140	141	142	143

FaxNET

Free Fast Information about the following advertisers.

- Call 1 - 800 - 664 - 8271, wait for prompt, follow instructions.
- Key in advertisers "5" digit number listed below.
- You will receive requested information within minutes.

COMPANY	PIN	COMPANY	PIN
Amcom Software	**34460**	Internet Security Corp	**34450**
Beame & Whiteside	**34400**	Isolation Systems	**34380**
Brixton Systems	**34210**	LanOptics	**34410**
Cogent Data Tech	**34060**	LearnKey Inc	**34120**
Communication Devices	**34030**	Network Dimensions	**30020**
Cylink Corporation	**34070**	Nextest	**34170**
Dataproducts	**34310**	Process Software	**34430**
Dataprobe	**34080**	Systems and Synchronous	**34420**
Frontline Test Equipment	**34470**	Telebyte Technology	**34440**

Connectivity - Circle #109

WE'RE TALKING 5250 EMULATION FROM ANY PLATFORM.

Access your AS/400 applications and databases from virtually any platform, with Brx5250 emulation software from Brixton Systems. Brx5250 works with • Sun Solaris (SPARC & x86) • RS/6000 • HP-UX • SCO Unix • UnixWare • Windows 3.1 • and Windows NT.

Move to open systems while leveraging your legacy hosts. Get full emulation capability, including print and file transfer. Plus a feature-rich GUI with windows, menus, and cut-and-paste capability between applications.

Leaders in software connectivity. The Brx5250 is part of a complete family of Brixton software that can link all your TCP/IP and SNA users, networks, and databases. Since it's all software, you're not tied to specific hardware. You build on your existing resources, and you keep your future hardware options completely open.

Find out why nearly 100 of the Fortune 500 are connecting with Brixton. Call today. Our 5250 emulation is a lot more than just talk.

TALK TO US.

1-800-BRIXTON

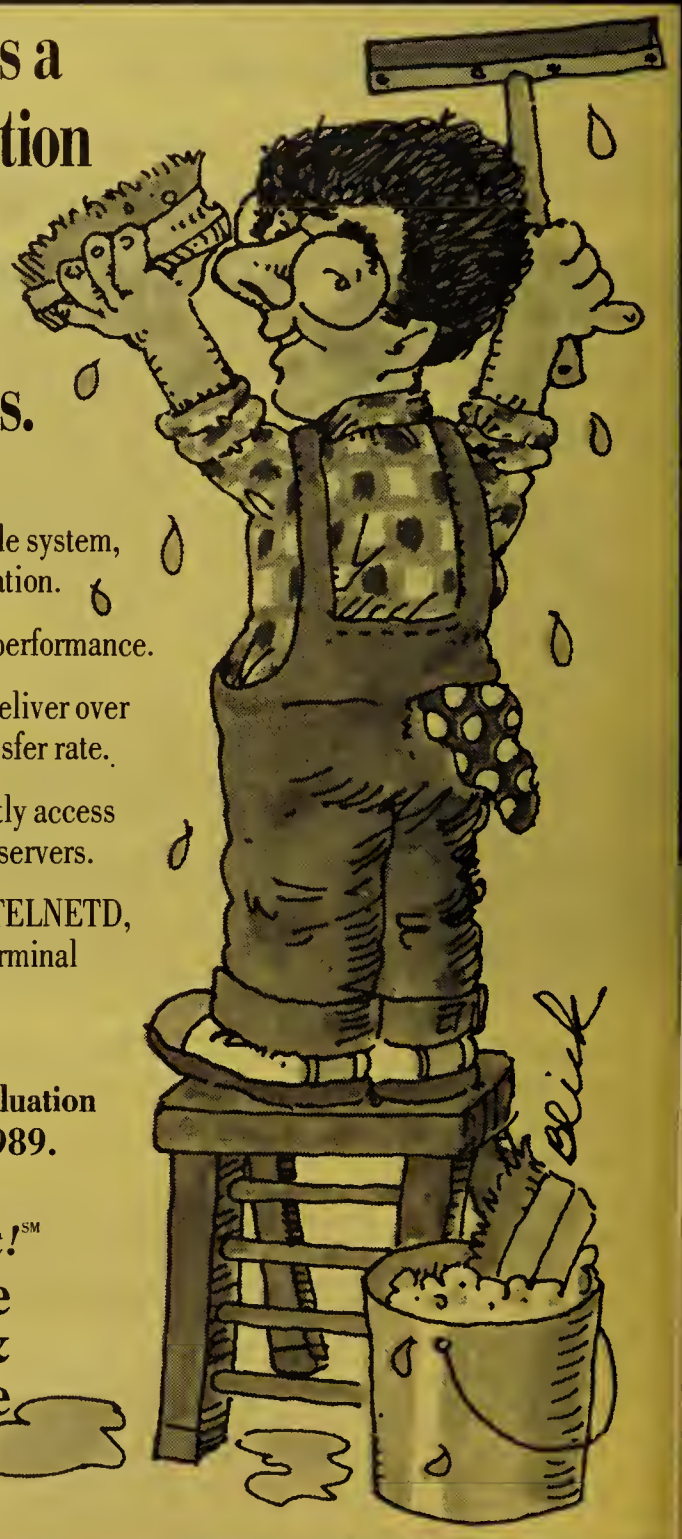
All trademarks are the property of their respective owners.

Brixton Systems, Inc., 125 CambridgePark Drive, Cambridge, MA 02140 USA

Connectivity Software - Circle #110

BW-Connect™ NFS for Windows NT

Gives clients a clear connection to faster NFS file and print services.



- ✓ Native 32-bit installed file system, kernel-mode implementation.
- ✓ Multi-threaded for high performance.
- ✓ On some platforms can deliver over 1 MByte-per-second transfer rate.
- ✓ NT users can transparently access and print files from NFS servers.
- ✓ Includes user apps like TELNETD, Mail reader, TN3270, Terminal Emulation and others.

For FREE 30-day evaluation call 1-919-831-8989.

Let's Connect!℠

Beame & Whiteside Software™

Trademarks are the property of their respective owners. Tel: (919) 831-8989, Fax: (919) 831-8990. ©1994 Beame & Whiteside Software, Inc. (059M2)

On The Info Hwy. With Carl & Fred™ by Blick

TCP/IP Networking - Circle #111

TCP/IP Applications for Windows

New Version! CHAMELEON™4.0

AUTOMATIC INSTALL OVER ODI OR NDIS

Implemented as 100% DLL (not a TSR)
Requires only 6KB of base memory
Installs in 5 minutes

More Windows applications than any other TCP/IP package

Applications:
Telnet (VT100, VT220, TVI), TN3270, TN5250, FTP, TFTP, SMTP Mail with MIME, News Reader, PROFS Mail, LPR/LPD, Ping, Bind, Finger, WhoIs, Gopher, Phonetag, Scripting, Statistics, Custom, SNMP Agent

Developer Tools:
- Windows Sockets API
- Berkeley 4.3 Socket API
- ONC RPC/XDR
- WinSNMP API

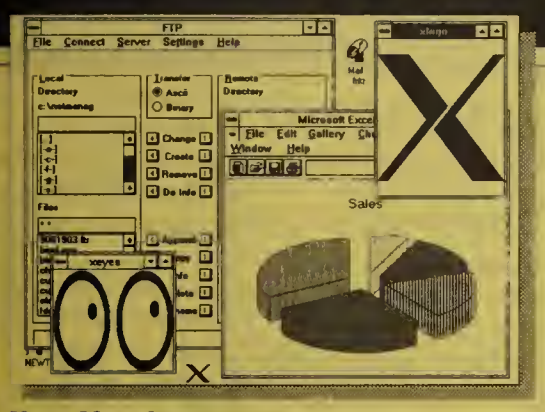
NEW! Gopher Client, TN5250, LPR/LPD
MIME Support in Mail, Scripting

May 1993

For overnight delivery call:
NETMANAGE™
(408) 973-7171
NetManage, Inc.
10725 North De Anza Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle #112

X for Windows



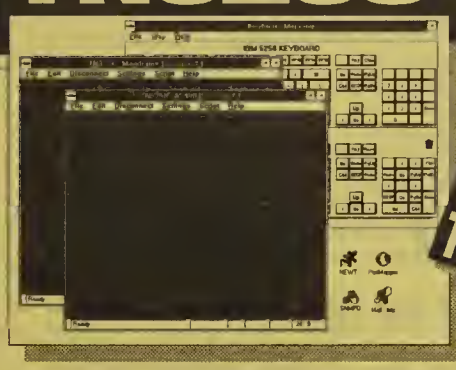
2 Products In 1
X Server & TCP/IP Stack
Optimized Pair

New Version:
- Compliant with X11R5 Standard
- Exploits full 32-bit architecture
- Takes only 10 minutes to install both X and TCP/IP
- Implemented as a 100% DLL (not a TSR)
- Requires only 6KB of base memory
- XRemote, super fast dial-up option

For overnight delivery call:
NETMANAGE™
(408) 973-7171
NetManage, Inc.
10725 North De Anza Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle #114

TN3270 TN5250 for Windows



Included in CHAMELEON™4.0
FREE TELNET

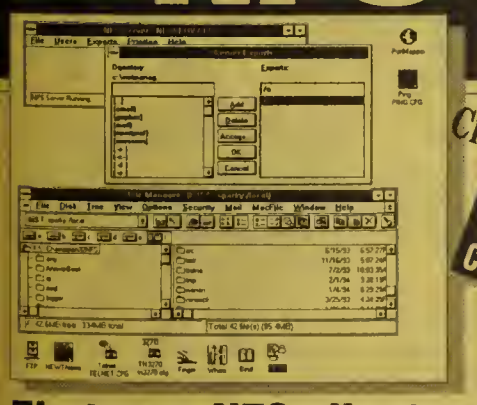
Comes with complete Internetworking Desktop Suite:
TELNET (VT100, VT220, TVI), TN3270, TN5250, FTP, TFTP, SMTP Mail with MIME, News Reader, PROFS Mail, LPR/LPD, Ping, Bind, Finger, WhoIs, Gopher, Phonetag, Scripting, Statistics, Custom, SNMP Agent

- Hotspots for faster Windows operation
- Visual Script Editor and Visual Script Player tools for automatic operation
- Drag and drop keyboard remapping
- HILLAPI Interfaces
- AS/400 Office Vision support
- IND$FILE file transfer for 3270
- Full APA Graphics including graphic mouse for 3270
- Up to 128 simultaneous sessions
- Works concurrently with Novell NetWare, Microsoft LAN Manager, Banyan Vines, Windows for Workgroups

For overnight delivery call:
NETMANAGE™
(408) 973-7171
10725 North De Anza Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle #113

NFS for NT



CHAMELEON32/NFS™
NFS ■ RPC
WINSOCK COMPATIBLE

First ever NFS client and server for Windows NT
- Up to 24 network drives
- Long file name support
- FAT and NTFS file system support
- Included in Chameleon32*NFS*
- Chameleon32*NFS* applications include: Telnet terminal emulation (VT100, VT220, TN3270), FTP (client and server), News Reader, TFTP, Ping, Bind, Finger, and WhoIs
- Available for Intel, Alpha and MIPs platforms

For overnight delivery call:
NETMANAGE™
(408) 973-7171
NetManage, Inc.
10725 North De Anza Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle #115

Internet Chameleon™

TCP/IP FOR WINDOWS

Office Home Remote

New Version! INTERNET CHAMELEON™
100% DLL WinSock Stack
5 Min. Installation

Internet Connectivity Software: Dial-Up, SLIP, PPP and ISDN, Pre-Configured for Popular Internet Providers

- Installs in 5 minutes
- Native Windows installation and ease of use

Applications:
Electronic Mail (SMTP, POP) with MIME and Rules, Internet News Reader, Gopher Client, File Transfer: FTP, TFTP, and FTP Server; Telnet, Utilities: Ping, Finger, WhoIs; SLIP & PPP Dial-Up Connections

For overnight delivery call:
NETMANAGE™
(408) 973-7171
10725 North De Anza Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

TCP/IP Networking-Circle#118

Has Your NT NFS Server Run Out of Steam?

Introducing NFSware™.

The only Windows NT NFS Server designed to handle anything.

Any File.

- Designed as native Windows NT application. Not a port of DOS or Windows NFS.
- Supports NTFS; FAT for MS-DOS; HPFS for OS/2; and CDFS for use with CD drives.
- Also exports any network directory.

Any Client.

- NFS V.3, NFS V.2, and NFS over TCP and UDP.
- Supports PC clients through *pcnfsd* – no UNIX required.
- Full 32-bit multi-threaded architecture for peak performance.
- GUI interfaces take the work out of creating security databases.
- TCP/IP stack independence gives maximum flexibility.
- Supported by Process' TCPcare service umbrella.

We accept:
American Express
MasterCard
Visa

Any Time.

24-hour fax line 508-879-0042 or call 800-722-7770 today!

NFSware Server Software: Quantity 1: $295; 5-Pack: $1,330; 10-Pack: $2,360.
A 60-day evaluation package is available over the Internet.

NFSware
Solutions by Process Software Corporation

Process Software Corporation
959 Concord Street
Framingham, MA 01701

Voice: 508-879-6994
Fax: 508-879-0042
E-mail: info@process.com
Web: www.process.com

Training Videos/Novell Netware-Circle#117

Tim Gendreau -Certified NetWare Instructor, ECNE, President of Training Solutions; one of the nations leading training centers, & contributing author of *Novell 3.x, Novell NetWare 4, & NetWare 4 for Professionals.*

CNE℠ TRAINING & MORE...

Kristy Closon - Certified WordPerfect Systems Engineer & Technical Author of *WordPerfect Office: The Complete Reference.*

SOFTWARE TRAINING VIDEOS

LEARN FROM THE EXPERTS™

KNOWLEDGE DIRECT TO YOU!

NetWare® 3.x

Basic Administration
Tune-up your Network! Save money, time, and increase productivity.
7 Tape Series - regular price $875
$695.00

Advanced Administration
Get the most from your Network and prevent costly downtime.
3 Tape Series - regular price $375
$295.00

COMPLETE CNA TRAINING SERIES SAVE MORE! BUY ALL 10 VIDEOS

Basic & Advanced
10 Tape Series - regular price $1250
$950.00

NEW RELEASE! Pre-order now Release date: Sept 1

NetWare® 4.x

CNA Certification Training
Take the mystery from your Network & increase profitability today!
8 Tape Series - regular price $1000
$795.00

NetWare® 4.x

Users Guide and Concepts
2 Tape Series with Tom Sheldon
$159.95

Novell GroupWise® and/or WP Office® 4.0

DOS® and Windows®
Get your office up-to-the-minute on intricate systems and delicate scheduling.
2 Tape Series - reg. price $120
$99.95

Get on the Information Superhighway!

Internet Atlas

with Tom Badgett
The Information Super Highway – everyone is talking about it. Let LearnKey take you from on-ramp to exotic locations across the globe. If you're not on the Internet but want to be, this is a must see video.
$29.95

Teach Me How!

SOFTWARE TRAINING VIDEOS
OVER 150 TITLES TO CHOOSE FROM!

- Windows Series with Tom Sheldon
- WordPerfect Series with Karen Acerson
- Lotus 123 Series with Judd Robbins
- Excel Series with Reed Jacobson
- LANtastic Series with Mike Montgomery
- Access Series with Tom Badgett
- Word Series with Tom Badgett

Tom Sheldon - Leading Operations System Consultant & best-selling author of *Novell NetWare 4: The Complete Reference, & The LAN Times Encyclopedia of Networking.*

LearnKey.

FREE CATALOG
LearnKey, Inc.
93 S Mountain Way Dr
Orem, UT 84058
801-224-8210
fax 801-224-8211

MONEY-BACK 30 DAY GUARANTEE

1-800-937-3279 EXT 60

Adapters-Circle#116

PCI ETHERNET IS HERE!

$129! (Twisted Pair version)

Now Cogent gives you the power of ***award-winning*** PCI technology for your Ethernet network. If you have a PCI machine, you need an Ethernet adapter which takes advantage of your new horsepower. ***Cogent has it now.*** With Cogent's innovative PCI adapters, there's no better way to connect your PCI machine to the net!

And only Cogent gives you ***Predictive Pipelining™*** technology for the fastest performance with the lowest CPU utilization.

What else could you want? Convenience and price? Cogent has that too. The ***"plug and go"*** EM960 PCI adapter is available in combo and twisted pair versions, and includes drivers for all popular networks. And, the EM960 PCI is available ***now*** at a great price.

Includes limited lifetime warranty

Go with the leader in performance, innovation, and quality.

Order Now!
1-800-4COGENT

cogent®

©1994 Cogent Data Technologies, Inc. All rights reserved.
All trademarks are the property of their respective owners.

T1-FT1 DSU/CSU - Circle #119

ADTRAN

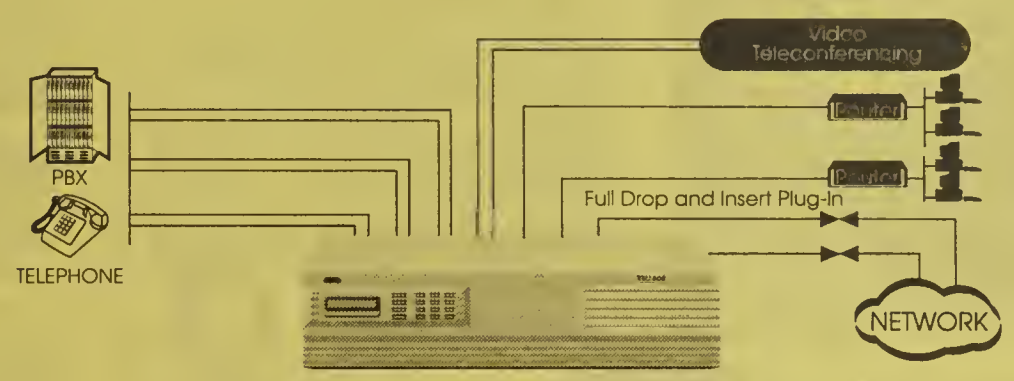
T1 FLEXIBILITY

NEW

ANNOUNCING ADTRAN's TSU 600

- Drop and Insert Capability
- SNMP Management
- Six Expansion Slots Accept Application-Specific Modules Supporting a Variety of Interfaces

For more information call
1-800-326-3700

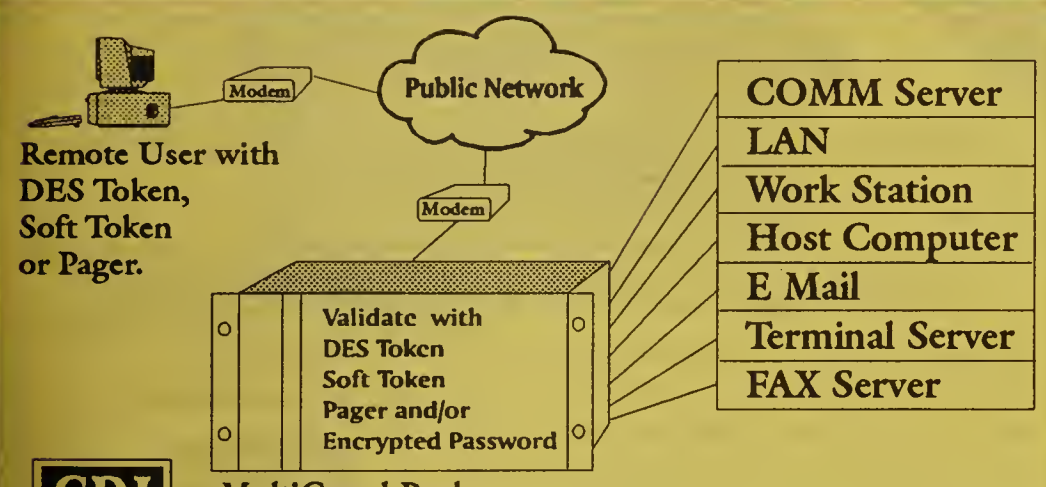


TSU 600

Access Control - Circle #120

Secure Remote Access
combined with a
Dial Network Manager

Two (2) for the price of One (1)



MultiGuard Rack

CDI

Communication Devices Inc.
1 Forstmann Ct. Clifton, NJ 07011

1 800 359 8561

FAX 201 772 0747

Analyzer - Circle #122

A Powerful Software-Based Analyzer that Monitors LAN Networks Easily, Accurately, Affordably.

To Order Call:
800-419-3496
708-505-3900

LANSleuth™

NOW SUPPORTS TOKEN RING!

LANSleuth sets new industry standards for LAN analyzers in price and performance:

- Windows Based
- Runs on any IBM-Compatible Hardware
- Works with Most Industry Standard Cards
- Supports TCP/IP, IPX/SPX, NCP, AppleTalk, SNA
- ODI and Packet Driver Interfaces
- Ping Utility
- Intelligent Filters, Triggers and Alarms
- *At its price, more features than any other software-based product on the market*

Systems and Synchronous, Inc.
900 E. Diehl Rd. ■ Ste 110 ■ Naperville, IL ■ 6056.
A smart investment at a great price!

LANSleuth+ (Ethernet and Token Ring) $690
LANSleuth (Ethernet) $390
LANSleuth junior (reduced Ethernet feature set) $149

LANSleuth is a trademark of Systems and Synchronous, Inc. All other brand or product names are trademarks or registered trademarks of their respective companies. ©1994, Systems and Synchronous, Inc.

Alarm Management - Circle #121

WAKE UP!

When network problems occur, you need to know ASAP. Dataprobe's Alarm Monitoring and Fallback Switching system are the total solution to your fault management needs.

Monitor local and remote sites and be instantly notified of alarms via Annunciator, PC or on your pager. Automatically engage redundant equipment, reboot systems or reroute comm circuits.

dataprobe

11 Park Place / Paramus, NJ 07652
201-967-9300 Fax: 201-967-9090

When Every Bit Counts

Branch Office Networking - Circle #123

Stackable Branch Office
StackNet™ with Integrated Cisco Routing

New From LanOptics

If you're ready to connect your remote offices to headquarters, but don't want to invest the high dollars and time it takes to do it, consider LanOptics' new instant branch office -- a multiprotocol stackable hub with Cisco AccessPro™ routing built right in. With all the features you demand in a hub and a router, LanOptics does the job at a fraction of the cost and in a fraction of the time.

- ❑ Available in Token Ring, Ethernet, 5250 and 3270 versions
- ❑ Stack up to six high for up to 72 ports of remote office connectivity
- ❑ Easy to install - just plug and play
- ❑ Managed base unit is all that is required to manage entire stack
- ❑ Optimized for the IBM environment

Call 1-800-533-8439
to receive your $200 certificate good toward any StackNet expansion unit

LANOPTICS

All trademarks are property of their respective owners.

Disaster Recovery - Test Access - Circle #124

FIBER OPTIC SWITCHING

STAR★SWITCH™

- Multi-LAN Interconnect
- Disaster Recovery
- Optical Test Access
- Video Routing
- High Speed Channel Switching
- SNMP Control
- All Transmissions Remain Optical
- Unlimited Bandwidth Capability
- ATM - ESCON - FDDI - Transport
- Protocol Transparency
- Up to 72 x 72 Matrix

NETWORLD + INTEROP 94

InteropNet CONTRIBUTOR ATLANTA SILVER

For information call:

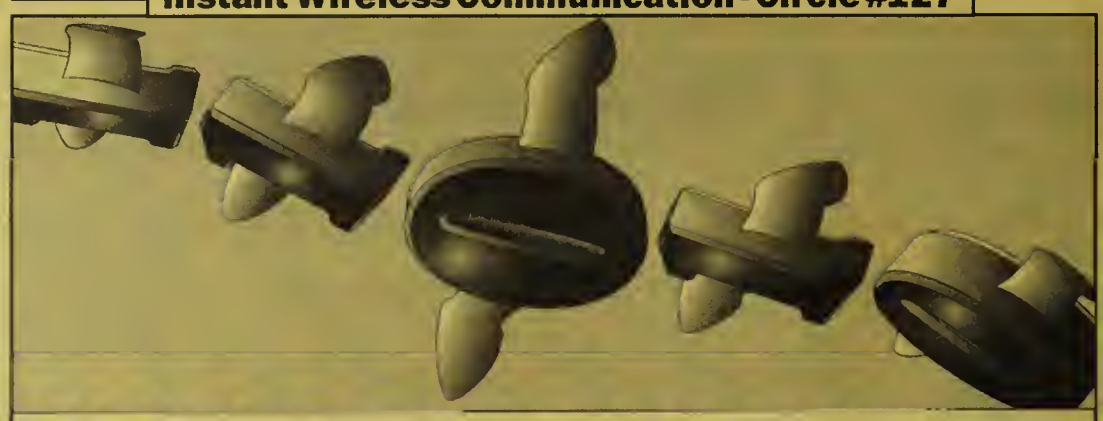
800-872-8777

ASTARTE
FIBER NETWORKS, INC.

2555 55th Street, Suite 100 • Boulder, CO 80301 • (303) 443-8778 • FAX (303) 449-2975

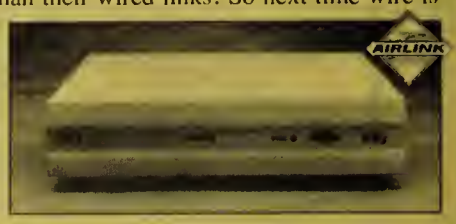
Star-Switch is a trademark of Astarté Fiber Networks, Inc.

Instant Wireless Communication - Circle #127



AirLinks go where wires won't!

AirLink™ digital wireless modems can transmit data, voice, video, or anything else you want to send, up to 30 miles away. They're perfect for that small remote site, tetherless videoconferencing, or a cost-effective, quickly deployed link. Speeds range from 1.2 kb/s to fractional T1. No license is necessary. And you can count on your data arriving at its destination; our users all over the world have reported their wireless links are more trouble-free than their wired links! So next time wire is too much hassle or too much money for the application, call the company that pioneered digital wireless modems. Cylink Corporation, 310 North Mary Avenue, Sunnyvale, California, USA, 94086. Toll-free (USA): 800-533-3958, FAX: 408-720-8294, Telephone: 408-735-5800. For instant, faxed information, call 408-735-6614, then enter 301. Worldwide sales & support.



CYLINK

© 1994 Cylink Corporation
Cylink is a registered trademark, and AirLink is a trademark of Cylink Corporation

Fiber Connectivity - Circle #125

OPTIPATCH

Intelligent Fiber Patching and Management System

- Fiber Patches with "LED" Indicators
- Real-Time Connection Status
- Audit Trail Database
- ST, SC and ESCON Connectors

Connect the "GREEN" Lights

TBAR
A DIVISION OF DATA SWITCH CORP

For Higher Network Availability Call:
1-800-726-*TBAR*

Internet Security - Circle #128

Internet Security

"BEST OF SHOW" INTEROP '94

NEW!

FireWall-1™

Software To Prevent Unauthorized Access To Your Internal Network

- ✔ Advanced filtering technology combines both application-level security and intelligent packet filtering
- ✔ Secure Access to *all* Internet services, including **Mosaic**
- ✔ Transparent to end users – requires no intermediate proxy gateway server
- ✔ Powerful Auditing and Alerting informs you immediately of any unwanted communications attempts

To receive a white paper on firewall technology or to arrange for a demonstration of FireWall-1, send e-mail to INFO@SECURITY.COM or call us at

(617) 863-6400

ISC
INTERNET SECURITY CORPORATION

FireWall-1 is a trademark of Check Point Software Technologies Ltd.

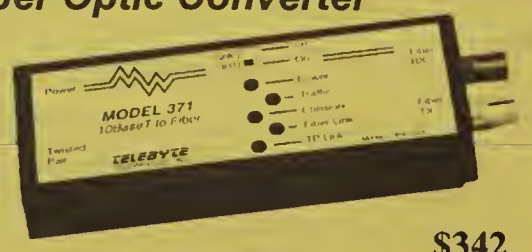
Fiber Optic Converter - Circle #126

Protect Your Network with Fiber

Model 371 10BaseT to Fiber Optic Converter

Features

- Extend LAN's Over 1 Mile
- Plug and Play - No Software
- Standard Fiber Optic Cables
- Lightning/Surge Safe
- Total Electrical Isolation
- 10 BASE FL Compatible



$342

Model 370 LAN-Spreader AUI to Fiber Optic Converter

$294

Features

- AUI to Fiber Optic Converter
- Extend LAN's Over 1 Mile
- Plug and Play - No Software
- Standard Fiber Optic Cables
- Lightning/Surge Safe
- Total Electrical Isolation
- 10 BASE FL Compatible

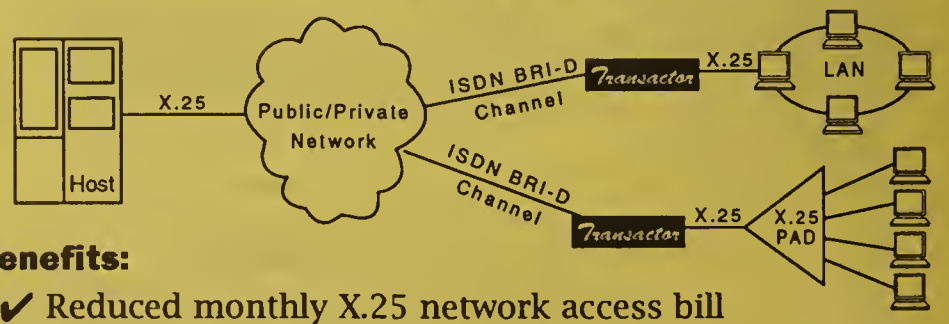
TELEBYTE TECHNOLOGY, INC.

Phone: 1-800-835-3298 • (516) 423-3232
Fax: (516) 385-8184 • (516) 385-7060
270 Pulaski Road, Greenlawn, NY 11740

ISDN/Frame Relay/X.25 Access - Circle #129

How can you substantially reduce your X.25 network access cost $$?

Install an ISDN-X.25 *Transactor!*



Benefits:

- ✔ Reduced monthly X.25 network access bill
- ✔ Completely digital service at up to 16Kbps over ISDN lines
- ✔ No changes to your application — Plug & Play

Ask about our Frame Relay & X.25 Access products

microtronix
200 Aberdeen Drive, London, Ontario, Canada N5V 4N2
Tel: (519) 659-9500 Fax: (519) 659-8500 Tlx: 064-5642

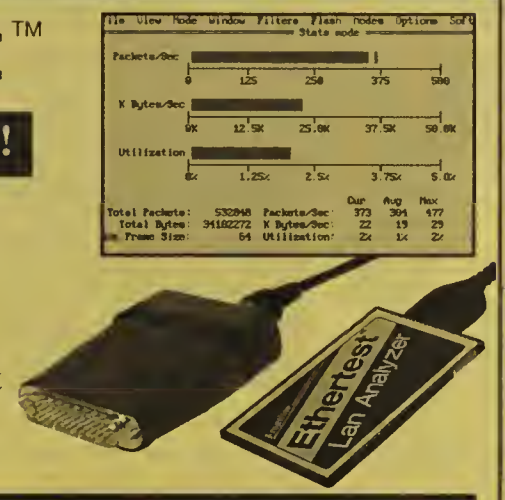
LAN Analyzer - Circle #130

Ethernet Analysis via PCMCIA or Parallel Port.

Ethertest™

PC-based. Now for Notebooks!

- Identifies Ethernet problems fast
- Powerful seven-layer decodes
- Statistics/network monitoring
- Sniffer® capture file import/export
- Low cost at $2995



Call now for more information and a FREE Ethertest demo disk.
1 (800) 359-8570

Frontline Test Equipment, Inc.
125 Windsor Drive, Suite 111, Oak Brook, IL 60521 U.S.A. TEL: (708) 575-8570 FAX: (708) 575-8577

Network Design & Documentation - Circle #133

Graphically Manage Network Data

GrafBASE is a one-of-a-kind, MS-Windows based graphical database, designed specifically for network documentation

Multiple layered views from WANs, MANs, LANs and equipment rooms

- Complete network documentation with an integrated database
- Heirarchically related graphical network presentations
- Graphical front-end for real-time, color coded, alarm management

- Object-oriented architecture
- PC 386/486 platform
- MS-Windows GUI

Price starts at $750 plus map data options

Call today for information and a free demo disk!
(408) 446-9598

N D **Network Dimensions, Inc.**
We make your network look good
5339 Prospect Rd., #312, San Jose, CA 95129

LAN Network Monitoring - Circle #131

LANtap 1000

MULTI-PORT LAN ACCESS SWITCH

- Shares Network Analyzers
- Reduces Network Costs
- Supports Token Ring and Ethernet
- Local and Remote Control

TBAR
A DIVISION OF DATA SWITCH CORP

For Higher Network Availability Call:
1-800-726-*TBAR*

Network Monitoring & Analysis - Circle #134

Nextest puts WAN Protocol Analysis on your notebook.

Nextest brings notebook compatibility to WAN analysis.

- **PCMCIA & Parallel Port interfaces**
- **Speeds up to 2 Mbps**
- **Async, SNA, X.25, Q.931, ISDN, & Frame Relay**
- **Plain-English decodes**

With Nextest's notebook compatibility you get the most powerful, light-weight, portable, and easy-to-use WAN analysis tools available.

Call (800) 888-0180, or (708) 574-3300.

Nextest

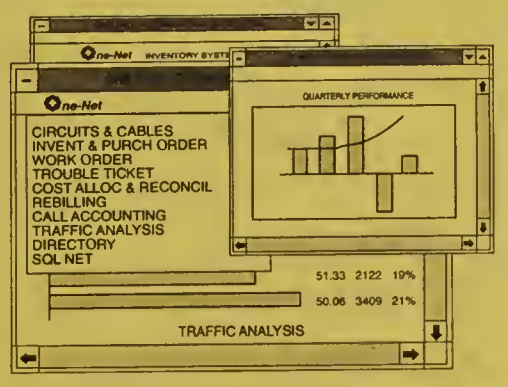
Network Cost Management - Circle #132

Get control of your network costs!

Use our ***One-Net*** Network Cost Management software to track, control and manage all of your inventory, cabling systems and network expenses from one unified database, with unlimited element capacity.

Rules-based design with an open, ORACLE *platform.* Define all types of equipment, wiring, cost structures, and catergorizations. Integrate with network management systems.

- Assigns techs, tracks problems, controls inventory.
- Streamlines daily adds, moves and changes.
- Captures all equipment, labor and calling charges.
- Allocates costs accurately.
- Identifies unauthorized use, abuse and misuse.
- Reconciles invoices, pinpoints overcharges.
- Centralizes corporate directory, reduces staffing.
- Integrates computer and telephone operations.
- Analyzes traffic patterns, optimizes resources and increases your company's bottom line.



Call us today and learn how you can provide faster, better service with greater control over your network operations.

1-800-852-8935

One-Net
Unified Network Cost Management

AMCOM SOFTWARE INC

FAX: 612-946-7700
Amcom Software, Inc., 5555 West 78th, Edina, MN 55439
ORACLE is a trademark of ORACLE Corporation

Network Monitoring Equipment - Circle #135

Multi-Port RMON LAN Monitor

Ethernet and Token Ring Compatible with:

- HP OpenView
- IBM Net/View
- POLYCENTER Net/View
- SunNet Manager

3-port unit delivered within *48 hours!*

TECHNICALLY ELITE CONCEPTS
The Network Optimization Company.

1-800-659-6975

Copyright © 1994 Technically Elite Concepts, Inc. All trademarks are the property of their respective owners.

Network Printers - Circle # 136

NETWORK LASER PRINTERS

One For All

A LASER PRINTER FOR ALL NETWORKS

LZR 1580 and LZR 2080 printers make users and network managers happy. Users are pleased with the flexibility: resolution up to 800 dpi, speed up to 20 ppm, paper handling up to ledger-size, and more! Dataproducts' Virtual Printer Technology (VPT™) lets each printer behave as if it were 64 unique printers, providing seamless communication with 22 network operating systems. Network administrators are raving, too. These printers are manageable and configurable remotely via the network, and they're simple to integrate. Call us today to find out more about the printer that can fill all of your network's needs.

yes It runs with NetWare

Call Toll Free
800 x 800 dpi
(800-980-0374)

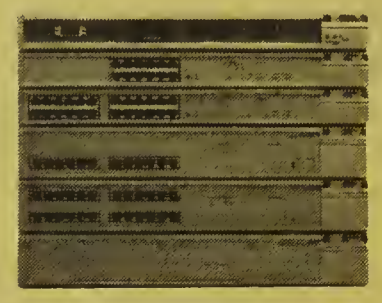
Dataproducts.
Taking your network printing by storm™

Stackable Systems - Circle # 139

Introducing a More Intelligent Way to Build a Network...

The Amazingly Flexible, Scalable 3Com® SuperStack™ System Architecture

SUPER STACK.



- ***SuperStack™*** *is the only stackable system with the flexibility to adapt to radically different networking environments.*
- ***SuperStack™*** *Systems are future-proof, integrating: Ethernet, Token Ring, SNA, FDDI, 100-Mbps Ethernet and ATM.*
- ***SuperStack™*** *Systems include an optional Redundant Power System for mission-critical fault-tolerance.*
- ***SuperStack™*** *Systems feature Transcend™, enabling enterprise-wide network management.*
- ***SuperStack™*** *Systems provide low-cost remote office solutions.*
- ***SuperStack™*** *Systems offer unique affordable density -- supporting small workgroups to large, multi-site WANs. A single hub stack can support 192 Ethernet or 256 Token Ring users.*

Call for more information on SuperStack™ and other *"Solutions for your network integration"*

1-800-4-MAXNET

Offices throughout the U.S.

3Com® 3Com Network Systems Integrator

©All trademarks are the property of their respective owners.

MAXNET communication systems, inc.

Remote Access - Circle # 137

Introducing Complete Network Access For Users On The Go...

3Com® AccessBuilder™*

Remote Access Performance Leader

- ***AccessBuilder™*** *provides dial-up network access for telecommuters, mobile users, and branch offices*
- ***AccessBuilder™*** *features SNMP management*
- ***AccessBuilder™*** *offers advanced security features*
- ***AccessBuilder™*** *features a high-performance, modular design*
- ***AccessBuilder™*** *offers concurrent multi-protocol bridging and routing*
- ***AccessBuilder™*** *works with TCP/IP client, AppleTalk®, MicroSoft LAN Manager, Banyan VINES®, DEC PATHWORKS™, IP, IPX, NetWare® RIP and More!*

Call for more information on AccessBuilder™ and other *"Solutions for your network integration"*

1-800-4-MAXNET

Offices throughout the U.S.

3Com® 3Com Network Systems Integrator

©All trademarks are the property of their respective owners.

MAXNET communication systems, inc.

Security - Circle # 138

INTERNET ENCRYPTION

GREAT FOR FRAME RELAY

NEW! Solve the problem of confidentiality between remote IP's across a TCP/IP based WAN

- Hardware based encryption
- Various encryption algorithms available (domestic, foreign, etc.)
- Supports PING, ARP, IRDP, limited ICMP
- Labeling mechanism allows support for multiple closed user groups
- Ethernet attachable to Cisco routers

ISOLATION SYSTEMS

26 Six Point Rd.
Etobicoke, Ont.
Canada M8Z 2W9
Tel: (416) 231-1248
Fax: (416) 231-8561
1 (800) 387-8706

Phone or fax for specifications and get on our complimentary newsletter mailing list

NOW LOOK WHO'S TALKING ABOUT NETWORK WORLD...

Solutions for network integration

MAXNET communication systems, inc.

September 19, 1994

Network World
161 Worcester Road
Framingham, MA 01701-9172

Dear *Network World*,

On behalf of MAXNET, I would like to thank you for a job well done. Over a year ago, our company decided to begin a print campaign that included advertising in *Network World's* Action Center and card decks. The power of these two media in increasing MAXNET's visibility as a nationwide system integration company has been overwhelming.

MAXNET has found the leads generated from *Network World* to be very positive and profitable. I would highly recommended other networking companies to advertise in Network World if they are seeking an effective advertising campaign. Keep up the great work!

Sincerely,

Bruce L. Masia
Director of Marketing Services

PUT ACTION CENTER TO WORK FOR YOU.

CORPORATE OFFICE: 1915 HOLLYWOOD BLVD., BLDG. A • HOLLYWOOD, FL 33020

Offices throughout the United States

FOR MORE INFORMATION CALL 1-800-622-1108 x500

DATA LINK SWITCHING
DLSw TESTER & DECODER

DTIX/DLST DLSw Tester
- Test Router implementation
- LLC2, SDLC,NetBIOS, SSP
- Only tool needed for DLSw
- Hundreds of canned tests
- Reduce manual testing time
- **TEST CATEGORIES:**
  - Functionality / Regression
  - Multivendor Interoperability
  - Performance & Latency
  - Congestion & Flow Control
  - Negative Testing
  - Reproduce client problems and build your own tests

DTIX/DLSD SSP Decoder
- Decodes SSP level frames
- Condensed / Detailed mode
- Needs no additional H/W
- Multilevel Filtering

SOURCE CODE LICENSING
DLSw, SSP, LLC2, SDLC

Digital Technology
Your partner in networking
617-229-9797
sales@dtix.com

Circle Reader Service No. 216

NEW REFURBISHED BUY SELL NEW REFURBISHED BUY SELL

MSI Communications
Nationwide Service • 24-Hour Technical Support
CNE Services • Trade-In Credit

WAN Products	Distribution Products		LAN Products
Adtran	Codex	Spectron	Cisco
AT&T Paradyne	Datatel	Symplex	Cubix
BAT	GDC	Tellabs	Develcon
Digital Link	IBM	Timeplex	Invision
INC	Micom	UDS	Lannet
Micom	Racal Milgo	Vitalink	Multi Access
NET			Synoptics
Newbridge			Wellfleet
Verilink			Xyplex

Specialized Services

Bell Atlantic Authorized Distributor · Sprint Authorized Agent · NOVELL Certified

Data, Voice & Video Networking
7 Waterloo Road, Stanhope, NJ 07874
800-866-3282 • 201-347-3349 • FAX 201-347-7176

NEW REFURBISHED BUY SELL NEW REFURBISHED BUY SELL

Circle Reader Service No. 232

Internet Access DIRECTORY

AlterNet, serv. of UUNET
(800) 488-6384 National
info@alter.net
SLIP, PPP, Leased Lines, UUCP, Frame Relay

BBN/BARRNET
(415) 725-1790 Bay Area
info@barrnet.net
SLIP, PPP, Leased Lines, Frame Relay

BBN/NEARNET
(800) NEARNET Northeast U.S.
nearnet-join@near.net
SLIP, PPP, Leased Lines, Frame Relay

CERFnet
(800) 876-2373 National
sales@cerf.net
SLIP, PPP, Shell, Leased Lines, ISDN, SMDS, Frame Relay, Info Servers

EMI Communications
(800) 456-2001 National
info@emi.com
PPP, Shell, Leased Lines, Frame Relay

Global Enterprise Serv.
(800) 358-4437 National
market@jvnc.net
SLIP, Shell, Leased Lines, ISDN, SMDS, UUCP, Frame Relay

HoloNet Service
(510) 704-0160 National
info@holonet.net
SLIP, PPP, UUCP

On-Ramp Technologies
(800) 340-7267 Southwest
info@onramp.net
SLIP, PPP, Leased Lines, ISDN, SMDS, Frame Relay, Metro Area Ethernet

Performance Sys. Int'l.
(800) 827-7482 International
info@psi.com
SLIP, PPP, Leased Lines, ISDN, UUCP, Frame Relay

Call Caterina Campisano at 800-622-1108 x465 for information on how to list your service here.

CNE Self Study

Guaranteed CNE Bundle
~~$430~~ **$325**

- ✓ Seven books for all seven tests
- ✓ CNE Test Master™ that has more than 2200 practice questions/answers on the disk

Rated "Excellent" by hundreds of students

Call for CNE Training in N.J.
1-800-PCAGE-60

PC Age
420 Rt. 46 E; Ste. 10; Fairfield, NJ 07004
Tel: 201-882-5370 • Fax: 201-882-4955

Circle Reader Service No. 218

IBM proteon DCA

BUY • SELL • TRADE

IBM 4MB TOKEN RING AT/MC	*$49.00*
IBM 16/4 TOKEN RING MC	$189.00
IBM 16/4 TOKEN RING AT	$349.00
IBM 8218 COPPER REPEATER	$199.00
IBM 8228 MAU	$199.00
IBM 8220 OPTIC CONVERTER	$599.00
IBM 5250 EMULATION AT/MC	$149.00
IBM 3270 EMULATION AT	$125.00
IBM 3270 EMULATION MC	$99.00
AST 5250 EMULATION AT	$169.00
DCA IRMA I BLOWOUT	*$49.00*
DCA IRMA III	$199.00
DCA IRMATRAC 16/4	$249.00
MADGE 16/4 SMARTNODE	$249.00
MADGE 16/4 STRIGHT BLUE	$239.00
PROTEON 1390 16/4 AT	$169.00
PROTEON 1890 16/4 MC	$149.00
PROTEON 1392 16/4 AT	$199.00

Piedmont Data Systems
Atlanta, Georgia
Phone (404) 449-3425
FAX (404) 441-1961

Circle Reader Service No. 224

INFORMATION DATA PRODUCTS CORP.

DSU / CSU'S
MODEMS
MULTIPLEXERS

NEW/REFURB
BUY/SELL/TRADE-IN

AT&T	N. E. T.
CODEX	PARADYNE
DCA	MILGO
IBM	UDS
MICOM	MORE ! !

800-362-3770

Circle Reader Service No. 217

ARE YOUR NEEDS TOO SMALL FOR THE **"BIG BOYS"?**

Call Mayflex Cables today and enjoy working with a company that will appreciate your business...
NO matter the size.

1-800-848-6491

Circle Reader Service No. 237

SAVE 50% & MORE ON MOST PRODUCTS

BUY/SELL/NEW/USED
LEASE/RENT

Reconditioned With Warranty

Modems • Multiplexers • T-1 • CSU/DSU's • Channel Banks

Newbridge Channel Banks	$3995
AT&T CSU/DSU NEW!	$275
T-1 CSU's	$499
CSU/DSU 56KBPS, V.35	$195
Telco Systems Channel Banks	$3995
Wescom Channel Banks	$3995
Datatel DSU/CSU 56KBPS	$375
Vitalink Translan III Bridges	$3995
Stat Muxes 4, 8, 16, 32, port	LOW
Verilink-Connect-1-DSU	$995
Channel Bank Leasing	$299/month

METROCOM
(800) 364-8838 or (713) 783-8838
FAX (713) 783-8832 24 HRS

Circle Reader Service No. 220

Buy Sell **Modems Muxes DSU/CSU** New Used

*** LARGE INVENTORY ***

AT&T	NEC
Codex	Paradyne
Datatel	Racal Milgo
GDC	Spectron
Kentrox	Timeplex
Micom	UDS
Microcom	Verilink

ISOM DATAPOWER, Inc.
(214) 840-6706
Fax (214) 271-1825

Circle Reader Service No. 223

Just Like A Private Tutor!

New Multimedia Books, Training & Market Reports

ATM Data Networks Frame Relay LAN OSI SONET/SDH X.25 and much more!

The KnowledgeBase™ series, for your PC or LAN, eliminates the expense and delay of traditional seminars and courses. Train engineering, marketing, and sales staffs as well as customers. Equally effective in the office, home, traveling or at remote locations. Stay on the leading-edge with our update service. Call for free catalog!

Reference Point 1-800-VIP-DISK, Fax (203) 272-7216

Circle Reader Service No. 225

Lotus Notes
Lotus cc:Mail
Computer Based Training

- comprehensive LAN based CBT
- self-paced and effective
- low-cost end user training
- extensive & realistic simulation

For information and demo disk call:
1-800-467-3304

ReCor, 906 University Place, Evanston, IL 60201 PH: 708-467-2059
All trademarks are the respective property of their owners

Circle Reader Service No. 236

NOVELL CNE 3.X
Complete Training Package!

NEW 801/802 Program - Self-Study
5 (2hr) Videos
1500 pg CNE Study Guide
Support CDROM and CNEQUIZR CBT Software

Special
$695

Call 800-475-3130

Circle Reader Service No. 257

LOOK NO FURTHER

If you are looking to reach Network, Corporate, and IS Managers who have the authority to buy your products and services, then Network World is your answer.

Marketplace

3Com..CISCO..SYNOPTICS..CABLETRON..NOVELL..SMC..PROTEON

LAN/WAN

3Com

3C1603-0	MGT. MODULE ..... $ 475
3C5803A	NETBUILDER LOCAL ..... $ 750
3C5823	NETBUILDER REMOTE $2200
3C5161	CS/200 ..... CALL
3C588	MULTICONNECT CHASSIS.. $ 750
3C582	THIN MODULE FOR 588 ..... $ 180
3C6XXX	NETBUILDER II ..... CALL
3C16XX	LINKBUILDER FMS ..... CALL

SYNOPTICS

3512	$1000
3000-01	$ 800
3002	$ 650
2715-04	$1550
208-ST	$ 200
3313	$ 550
3323	$1000
2310	$ 975

3 Com 509-TP $85 QTY 10

PROTEON

4100+	$2000
4116	$ 350
4118	$ 400
4119	$ 750
7102	$ 400
P134	$ 200

NEW NETWORK ADAPTERS

	3Com	SMC	INTEL	NOVELL	CLONE
8 BIT COAX	140	110	120	130	69
16 BIT CX/TP	99	95	95	95	59
16 BIT COMBO	110	105	105	105	75
32 BIT CX/TP	235	235	235	235	89
16/4MB TOKEN	405	255	375	400	250

NETWORTH

4000/10	$1600 U
4000/3	$ 500 U
UTPM 12	$1450 U
4000/ENT	CALL
4000/SAT	CALL

CABLETRON

TRMIM-24	$1150
TPTMIM24	$1700
IRM 3	$2300
MMAC8FNB	$1300
TPTMIM	$ 400
IRM2	$1800
MR9000C	$ 975
MRXI	$1000

NETWARE

# OF USERS	3.12	4.02
5	$ 585	$ 825
10	$1270	$1850
25	$1850	$2700
50	$2475	$3400
100	$3475	$4700
250	$5375	$8475

GENERIC ETHERNET

2 PORT REPEATER	$325
4 PORT REPEATER	$400
8 PORT RJ45 HUB	$245
16 PORT RJ45 HUB	$325

VISA MC U=USED

10 BASE - T HUBS

3Com	1627-0 $ 400	SYN	2800A $640
	1627-1 $ 605		2803A $690
	1637-1 $1050	SMC	3512TPI $950
	16670 $ 590		3812TP $590

ERGONOMIC INC.
47 WERMAN CT.. PLAINVIEW, NY 11803
516-293-5200 FAX: 516-293-5325

LARGEST NEW/USED 3Com INVENTORY ANYWHERE

WE ALSO BUY & SELL USED LAN EQUIPMENT - CALL FOR PRICES

800-AKA-3COM (800-252-3266)

Circle Reader Service No. 215

REFURBISHED SynOptics®

Largest Inventory of Refurbished SynOptics in America!

- SynOptics Trained
- Proven Track Record
- SynOptics Authorized
- One Year Warranties

Cabletron NOVELL IBM
Proteon 3COM FiberMux

$85 3C509-TP 5 pc.

VISA MC

National LAN Exchange
800-243-LANS
1403 W. 820 N. Provo UT 84601 Voice 801-[illegible]-0074 FAX 801-[illegible]-0078

Circle Reader Service No. 231

Three good reasons to audit your software use now.

1. You'll sleep a lot easier. Did you know it's a FELONY for a company to have just 10 unauthorized copies of software worth a total of just $2,500? That your company could be fined up to $250,000 and that YOU could go to jail for up to 5 years? The Software Publishers Association took action against 1324 companies for software piracy in 1992 and 1993 alone, resulting in $7.5 million in fines. Don't let your company be next.

2. You'll see how to save piles of money. If you buy a copy of each software package for every person in your company who uses it, you're throwing money away. Lots of Money. Most popular applications these days, including products from Microsoft and Lotus, are licensed concurrently. By fully exploiting these concurrent licenses, you can legally save up to 80% of your software costs- while actually increasing access to users.

3. You can do it for FREE. For a limited time, Express Systems is offering its Express Meter Audit Kit, normally $295, FREE to qualified network administrators. The Audit Kit is an easy-to-use, powerful tool that audits software usage- not just illegal copies. You'll see if you're using your software legally and find out how much money you could save.

For your FREE audit kit, call 800-321-4606 today!

Express Systems ANWT2

Novell Netware For Less!!

# of users	5	10	25	50	100	250
v 3.12	525	1165	1695	1975	3475	5395
v 4.02	Call for 4.01 and 4.02 Netware Prices					

Netware upgrades at up to 50% off....Call for a quote!

Hardware

NE2000 Coax /TP Combo	$34	8 Port Hub / Conc	$158
3Com509 / TP 16 bit 5 pack	$100	12 Port Hub / Conc	$295
3Com509 / Combo 16 5 pack	$105	16 Port Hub / Conc	$365
SMC Ultra EISA 32 Bit	$239	Hub / Card Packages	Call
Pocket Ethernet	$158	Full Network Package	Call

*3Com * Accton * Asante * Eagle * Intel * Microdyne * SMC*
*SVEC * SynOptics & many more.... Call Now for quote!*
We carry all network connectivity products
*** Dealers Welcome!!! ****

NOVELL

Vandy Micro Systems
1-800-373-2485

3Com

*Visa * MC * American Express * Fax-A-Check*
Fax (714) 768-1063

Circle Reader Service No. 221

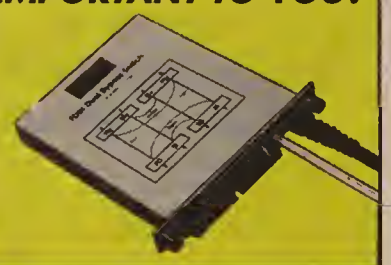
FILE SERVER SAM III

PENTIUM 90 MHz DUAL PROCESSOR
•UPGRADEABLE
•9 GB HARD DRIVE
•8 GB TAPE BACKUP
•32 MB RAM EXPANDABLE TO 1 GB $9999
ALL PERIPHERALS ARE EXPANDABLE & MIRRORED. NEARLY ALL SILICON VALLEY COMPANIES HAVE USED ACS FOR 11 YEARS.
Call for your configuration

ACS
408-732-6200 Tel
408-749-9449 Fax

Circle Reader Service No. 239

IS FDDI RELIABILITY IMPORTANT TO YOU?



FDDI DUAL BYPASS SWITCH

- Protects Against FDDI Station Failure or Power Loss.
- Rack-Mount Option Available.
- Over 10,000 Units Sold.
- Low Quantity Price of $650.

DiCon FIBEROPTICS, INC
Tel: (510) 528-0427
Fax: (510) 528-1519

Circle Reader Service No. 222

New! Contract TariffAlert™ Service

The exclusive fax service guaranteed to pay for itself or your money back

Here's how it works:

We review every contract tariff filed. We analyze the availability and restrictions:

- Services and term
- Dollar, time and circuit commitment

... and fax you a report at the close of business every Friday, covering every CT filed that week.

Let CCMI, the nation's leading tariff tracking organization, do your contract tariff legwork

Get the latest **Contract TariffAlert™** Faxed to you FREE
Call 1-800-929-4824, ext. 835 today

CCMI

LEARN ATM ON YOUR PC

TELEtutor®
Using Technology To Teach Technology

800-542-2242
FAX 603-433-2260

Circle Reader Service No. 219

LAN/WAN • BUY/SELL
MODEMS — FULLY WARRANTEED
DSU/CSU's — NEW/REFURBISHED
MULTIPLEXERS — RENTAL
T-1 EQUIPMENT — LEASE
HUB, BRIDGES, ROUTERS, ETC.

PRODUCT	DESCRIPTION	PRICE
AT&T/Paradyne	3201 T-1 CSU	$795
Cabletron	New or Used	Call
Cisco	New or Used	Call
Digital Link	DL-100-102	$1,795
Infotron	InfoStream 1500	$2,495
Kentrox	T-Serv II	$650
NEC	AdpCm Transcoder	$3,700
Telco Sys.	Chan. Bank	Call
Verilink	551-VST-L2	$995

We carry all manufacturers, call John, ext. 101.

ADCS INC.
PHONE 800-783-8979
FAX (916) 781-6962

Circle Reader Service No. 240

Your Ad Could Be Here For $255

Wouldn't you prefer to have your customers looking at what you have to offer here?

Caterina Campisano
800-622-1108

Coming in November!!!

Three buyer's guides and
Bonus Distribution at CMA, Comdex, & DCI Mobile World.
Don't miss these great advertising opportunities!!!

Caterina Campisano
800-622-1108 x465

Networking Careers

LOCAL REPRESENTATION

Informer Data Security, the leader in software based Access Security technology, is currently seeking local support in many markets throughout the U. S. and Canada. The ideal Reseller will be active in all aspects of Data Communications Technology with the ability to integrate sophisticated software. Extensive training, distribution discounts and manufacturer support provided. For more information please call **1-800-860-INFO** ext **205.**

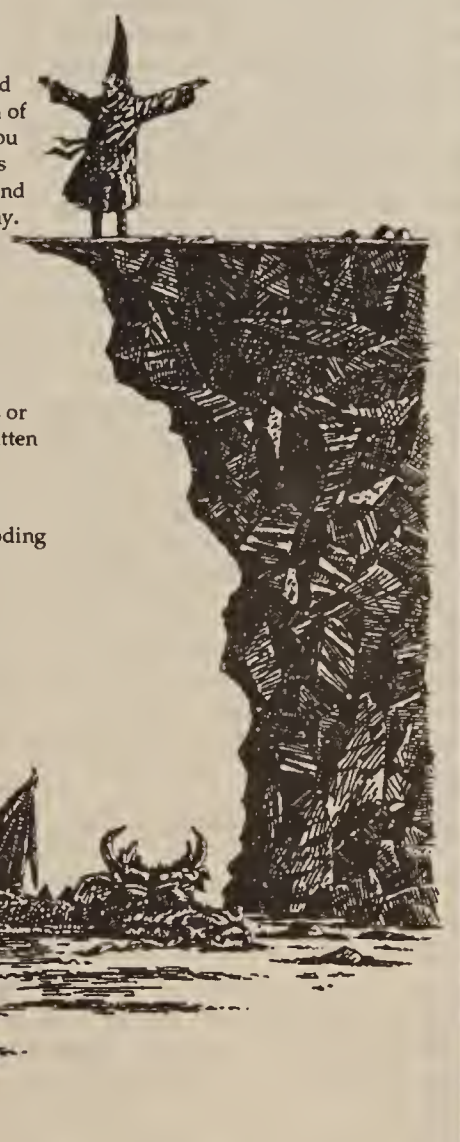
SYSTEMS ENGINEERS SALES EXECUTIVES

If you're a Major Player in the Data/Voice Communication Environment selling or supporting State of the Art Technologies of TCP/IP, DECNET, ETHERNET, X.25, T-1, FRAME RELAY, LAN TO WAN INTERCONNECTIVITY, SNA, ATM, etc, SSC is a National Search Firm that Specializes in your career potential. Call SSC and we can make confidential contact for you with the Leading Edge Companies of today.

SSC **National Placement**

(215)544-8690 Fax (215)544-8694
130 South State Road, # 209
Springfield, PA 19064
Call: JOHN GRANT or
BERNADETTE McCALL

Join the Power of Operable Networks as a Network Engineering Professional



International Network Services (INS) is a nationwide leader in providing innovative networking solutions and consulting services. We have gathered together the best people in networking and are looking to expand our team of network engineering wizards. As an INS Systems Engineer/Consultant, you will be challenged in some of the most technologically advanced companies in the world. You will be involved in planning, designing, implementing and troubleshooting the most complex and heterogeneous networks in use today.

You will need a thorough knowledge of LAN / WAN Internetworking technology, including network protocols, diagnostic tools and network management systems. All of our wizards have experience in telecommunications, hands-on LAN / WAN experience and exposure to multiprotocol routed environments.

These positions require a BS in Electrical Engineering, Telecommunications or equivalent, strong consulting and interpersonal skills, presentation and written communication ability and a keen sense of business organization.

The challenges are great and the rewards include tremendous professional growth and camaraderie with the finest network professionals in this exploding service industry.

Positions available in:

Dallas, Atlanta, Boston, Los Angeles, New York City, New Jersey and the San Francisco Bay Area.

International Network Services
P.O. Box 7700 MD 222
Mountain View, CA 94039-7700
Fax: 415-254-4288
staffing@INS.COM **EOE**

I·N·S
INTERNATIONAL NETWORK SERVICES

The Monster Board

Jobs On The Internet

Your highway to a new career

*

Programmer/ Analysts
Software Engineers
Customer Support
Test Engineers
Network System Administrators

*

Easy To Find **Mosaic** Web page

*

Interactive Interface

*

Apply On-Line

*

Your Source For **100's Of Jobs**

*

Key in: http://www. **monster.com**

E-mail ?'s to: Webmaster@monster.com

Hot Topics + Big Trade Shows =

Great opportunities to recruit just the RIGHT people for those hard-to-fill Networking positions

Oct. 31 Issue - Buyers guide: Videoconferencing
Space reservation close 10/19.

Nov. 7 Issue - Special Issue: Wireless Communications
BONUS DISTRIBUTION AT
Communications Managers Association Show, New York City. Space reservation close 10/26.

Nov. 14 Issue - Buyers Guide: Remote LAN Access
BONUS DISTRIBUTION AT
Comdex, Las Vegas. Space reservation close 11/2.

Call Pam Valentinas at 1-800-622-1108 to reserve space for your recruitment ad

Develop/Implement Business and Product Plans for NETWORK MANAGEMENT PRODUCTS as Sr. Product Manager

Racal-Datacom is an acknowledged leader for WAN, LAN, Network Management and Inter-networking solutions in domestic and international markets.

In this position you would work throughout product life cycles – from development of marketing requirements (including market potential, price/cost goals) through technical development of the product, business/product plans (competitive analysis, ROI, etc.), implementations (project management, manufacturing start-up, etc.), while continuously monitoring/adjusting products to the marketplace.

Requires Bachelor's degree (MBA preferred) in Marketing, Business Administration, or a related field (or equivalent), along with 5+ years in technical product marketing that includes 3+ years recent experience supporting data communications NETWORK MANAGEMENT PRODUCTS.

We support our professionals with the same commitment to excellence we make to our products...with a compensation offering that includes a competitive salary and comprehensive benefits package. Mail or **FAX (305/846-5025)** your resume and salary requirements in complete confidence to: Human Resources Dept. (23888KT); **Racal-Datacom;** P.O. Box 407044; Ft. Lauderdale, FL 33340-7044.

An EEO/Affirmative Action Employer
PRINCIPALS ONLY

WE UNDERSTAND NETWORKING INSIDE AND OUT.™

RACAL

Synergy

Continued from page 1

create Internet Protocol-based virtual LANs.

VNS is a condensed version of the Cisco's Internetworking Operating System routing software that will let Synergy receive routing table updates from a centralized route server, which will maintain those tables.

The route server, which will initially be a Cisco 7000 router, will handle all routing needs across the campus backbone as well as provide access to the wide area.

Synergy will also be positioned as an ATM gateway switch that sits on the edge of a net and gives users of shared-media LANs access to switch-based ATM nets. In that role, Synergy will take in LAN packets and convert them into 53-byte ATM cells for transport across an ATM net. Initially, Synergy will support a 155M bit/sec ATM interface and the LAN emulation standard the forum embraces.

The switch is based on Cisco's Catalyst device, a fixed-port Ethernet switch that supports dedicated links of 10M bit/sec Ethernet to high-end desktops, servers and workgroups as well as Copper Distributed Data Interface or FDDI backbone connections.

Synergy will be modular in design and support many modules, including standard 10Base-T Ethernet, switched Ethernet, FDDI/CDDI and ATM interfaces. Token ring and 100VG-AnyLAN support will be added in 1995 as will a combination module that handles 10M bit/sec Ethernet and 100VG-AnyLAN.

Synergy will also support Cisco's Enhanced Network Services software, which includes support for all nine Ethernet Remote Monitoring groups. A SNMP-based management card will also be part of the module mix and support the ENS software.

Cisco declined comment, and pricing data was not available.

Reality Check

Product: Synergy
Company: Cisco Systems, Inc.

The benefits:
- Provides traditional LAN users with access to ATM networks.
- Lets users build virtual LANs and route traffic among them.
- Offers RMON capabilities.

The drawbacks:
- Supports just 100VG-AnyLAN, not 100Base-T.
- Lacks token-ring support in initial release.
- General availability not until April 1995.

The analyst view:

"This will let Cisco compete with the likes of Agile and Xylan at the network edge."

Melinda Le Baron

Congestion

Continued from page 6

topology changes than do distance-vector protocols such as RIP, she said.

With link-state protocols, routers transmit information about themselves only when something has changed. And each router stores a complete map of the network, instead of summaries of each hop, so they can make more intelligent routing decisions.

"With NLSP, our net runs a lot better," confirmed Randy Dalhoff, assistant director, networks, for the computation center at Iowa State University in Ames, Iowa. "It certainly cleared up a large amount of the traffic going out to advertise Novell routers and servers."

"I think NLSP is going to be a big deal," agreed John Dubiel, manager of planning and technology for Boston Edison Co. "We were setting up a WAN, and SAP just clogged it up and couldn't get anything else done," Dalhoff said.

NLSP is also important to future Novell technologies, Petrosky said.

"NLSP will be the routing used in ATM environments," she said, but NetWare on ATM will not be practical for the foreseeable future. "They haven't begun this work yet."

Novell: (800) 638-9273.

Mardesich is a free-lance writer in Los Angeles.

Video spec

Continued from page 7

to the technology.

"The PCWG spec provides a mechanism for interoperability in LAN video systems," said Dick Moeller, chief executive officer of VTEL. "It's because customers want interoperability that we're behind this."

Among other vendors that pledged to roll out products or services for the PCWG video and data-sharing standard were AT&T, Compression Labs, Inc., Ericsson GE, Novell, Inc. and VideoServer, Inc.

GELSINGER

The PCWG spec will be the common means several vendors will use to packetize video and data on a LAN while ensuring it can also be sent over ISDN or switched services.

The PCWG spec will also define a gateway for converting signals from the PCWG coder/decoder, which is based on Intel's Indeo codec, into H.320-compliant streams. H.320 is the International Telecommunication Union (ITU) set of standards for audio and video. H.320 was designed to link disparate room or group systems over ISDN, switched services or T-1 lines, but was not intended for LAN-based systems.

However, it is not impossible for H.320 to work on the LAN, as RADVision, Ltd. last week demonstrated.

According to members of the PCWG, the group's upcoming specification will include the ITU data conferencing standard T.120, which is expected to be complete by next March. But it extends T.120, which is oriented toward ISDN, to include LAN services, as well.

Support for T.120 in data-sharing software would provide for multivendor product interoperability.

Members of the PCWG intend to introduce products and services in the next few months based on PCWG spec. But AT&T currently has no plans to implement the PCWG spec in its Vistium desktop conferencing product, said Ernie DeNegras, vice president of WorldWorx network service.

AT&T intends to support PCWG only in its multipoint control unit for tying multiple sites into a single conference, and as a dial-in network service, DeNegras said.

The PCWG 1.0 is intended as an industry specification, not as a possible ITU or Internet Engineering Task Force standard, Gelsinger said.

But to some analysts, PCWG's biggest role may be to put Intel in control of LAN-based video's future since the spec requires support of an upcoming version of the Intel Indeo codec.

"Basically, they're all agreeing to support an Intel product," said Eliott Gold, analyst and president of Altadena, Calif.-based TeleSpan Publishing, Inc.

"They're trying to avoid a standards fight by going with Intel," said James Key, head of Atlanta-based consultancy The Key Group, Inc. "But it really leaves Intel in control."

That sentiment was echoed by PictureTel Corp., which dropped out of the PCWG, asserting Intel was dominating the group. "I think PCWG is a way for Intel to exert control of the desktop video market," said Tony Paradiso, PictureTel marketing manager.

Video voting committee

Vendors deciding on PCWG specification:

- AT&T
- Compaq Computer Corp.
- Compression Labs, Inc.
- * **Digital Equipment Corp.**
- Ericsson GE, Inc.
- * **Hewlett-Packard Co.**
- Intel Corp.
- Lotus Development Corp.
- * **NEC Corp.**
- Northern Telecom, Inc.
- Novell, Inc.
- * **Olivetti Corp.**
- Software Publishing Corp.
- VTEL Corp.
- WordPerfect Corp.

* **New members**

SOURCE: INTEL, HILLSBORO, ORE.

IBM

Continued from page 1

ponent included is IBM's existing Systems Performance Monitor, which tracks network application performance, enabling managers to run their networks.

The OS/2 Warp LAN Client Connectivity Solution, which is scheduled to enter beta testing this year, includes the client portions of LAN Distance and Systems Performance Monitor, as well as requestors for LAN Server and Novell, Inc.'s NetWare. It is roughly analagous to Windows NT Workstation, the LAN client version of Microsoft's operating system. OS/2 Warp competes more directly with Microsoft Windows95, formerly Chicago, a desktop operating system now scheduled for release by mid-1995.

A LAN Server 4.0 demonstration drew the attention of IS managers at the Warp introduction last week, piquing their interest in the LAN Server Connectivity Solution. "It looks easier to manager than Novell [NetWare]," said William Starmer, associate MIS analyst with Bank of America in San Francisco, whose site runs a pair of NetWare LANs. Deploying software under the LAN Server administration tools appeared simpler and more flexible, he added.

LAN Server 3.0 user Wayne Klein, LAN manager at ISSC, Inc. in San Francisco, will update the handful of DOS workstations on his 300-node LAN to OS/2 Warp 3.0 and urge some Windows users to switch.

"Warp runs Windows and DOS as well as OS/2 programs smoother and easier," he said.

Since the applications are stored on the server, his support tasks should be simpler as desktops would be consistent and able to run many applications unmodified, he said.

Windows NT was not around when Syed Zaidi, systems specialist at Southern Pacific Transportation Co. in San Francisco, needed a 32-bit, multitasking desktop operating system for a 350-user LAN, and it doesn't offer enough advantages to switch, he said. The new editions of OS/2 will let him build on the existing system. "This will keep us pretty much an IBM shop," he said.

OS/2 Warp Version 3.0, the desktop OS and core of the client and server products, is to ship by the end of the month (*NW*, Sept. 26, page 21). It, too, contains connectivity features, such as built-in access to Internet and CompuServe, TCP/IP support and a real-time conferencing utility. OS/2 Warp now runs on Intel Corp. 386- and 486-based personal computers, but a version for the PowerPC is due next year.

IBM will first offer a $79 competitive upgrade to Microsoft Windows users. The product's suggested retail price is $129, and IBM expects street prices of $80.

DMTF

Continued from page 4

this meeting came from IBM. The company said it would develop common DMI-based agent software for its OS/2 and AIX platforms. The agent would also be part of the Karat systems management products IBM recently announced (*NW*, Sept. 19, page 1).

Karat is new object-oriented management technology IBM will use to build common management apps across all of its systems. The DMI agent will feed OS/2 and AIX management data to the Karat platform.

The firm said it would incorporate DMI's service layer in its OS/2, AIX and DOS Windows products. The DOS Windows implementation is available now, and the others will be available by the end of the year, said Ken Edwards, IBM's product manager for IBM LAN management platforms. The DMI service layer coordinates communications between desktop components and management applications.

Edwards said IBM would also bring DMI to its Application System/400 and its family of LANStreamer Token-Ring and Ethernet cards by the first quarter of 1995.

Other companies that announced DMI-compliant products, including:

■ PC hardware vendors Compaq Computer Corp., which showed the DMI in its Deskpro XL Series; Dell Computer Corp., which displayed its DMI Service Layer implementation; and Hewlett-Packard Co., which demonstrated its DMI implementation in its Vectra PC system.

DMI support for these products should be available this year or early 1995.

■ Digital Equipment Corp., which announced the integration of DMI in its PolyCenter AssetWorks and PolyCenter Manager on NetView. DMI will enable those platforms to exchange data with other enterprise platforms. Products implementing DMI are expected next year.

■ Novell, which announced DMI for its NetWare and UnixWare server, as well as its client software that will not only send data to other platforms, but also communicate with Novell's Network Management System (NMS). Novell showed how NMS could manage multiple environments by receiving data from IBM's OS/2 DMI clients.

"Users have labeled management of their desktop resources a high priority, and very soon products will be available that address those concerns," said Shannon Gray-Voigt, DMTF chairwoman and industry standards marketing manager for Intel Corp., one of the DMTF's eight founding members. IBM, Microsoft Corp., Digital, Novell, HP, SunConnect and SynOptics Communications, Inc. are the others.

DMTF: (503) 696-9300.

APPN

Continued from page 14

plete in the next three weeks, which means users could see standardized DLSw implementations by the end of the year, said Gene Cox, a senior programmer with IBM.

3Com's Bryant said the ability to add vendor-specific features is also in the works for the APPN architecture, although that capability is unlikely to appear before late 1995.

"It will help us add features that users want immediately, rather than wait for IBM's approval," he said. "IBM is much more open to this kind of major change to APPN's structure than it has ever been in the past."

One extension to the APPN architecture that was endorsed at this meeting was multivendor support for IBM's Border Node technology. Border Node lets users link multiple SNA nets together into one big net or segment larger SNA nets into smaller pieces that can still communicate, said Ralph Case, manager of IBM's APPN architecture. Today, however, only IBM SNA- and APPN-based devices can support Border Node.

"We want to let users build mixed-vendor APPN nets," Peters said. "[That's] especially important for companies that have grown by merger and have lots of nets."

The AIW also formed a group to see how SNA and APPN will work with ATM nets in the future.

DAVID KELLERMAN

Clockwise from upper right: Marcia Peters, Ralph Case and Gene Cox of IBM

"There are a lot of details to be worked out, but our first step will be to make it easy to set up [permanent virtual circuits] through ATM networks and then add interfaces for APPN, TCP/IP and others," said Rick McGee, director of IBM's networking controller line.

"It is a major failing that IBM hasn't said how it will map SNA to ATM yet," said Robin Layland, principal consultant with Layland Consulting in West Hartford, Conn.

In addition, IBM demonstrated how its High Performance Routing (HPR) technology could help users build more robust wireless networks. HPR is an extension to APPN that promises to enhance performance and add the ability to automatically reroute around failures.

With HPR's help, mobile SNA/APPN users could have an easier time accessing hosts. Today, as remote users move between wireless cells, they can lose a host connection. HPR software in the mobile computing devices, such as a laptop, could help ensure that the session is maintained.

IBM did not say which products would use wireless HPR features or when they might be available.

✆IBM: (919) 254-4957.

IDNX

Continued from page 4

One shortcoming of the IDNX software Version 13.X1, however, is that it is not compliant with Simple Network Management Protocol-based enterprise net management systems.

"The physical scalability is no big to-do for us," said Paul Breaux, a network manager at Texas Instruments, Inc. in Plano, Texas. "But the domain-based subnetting might [facilitate] our global network management, except that NET still doesn't provide SNMP [Management Information Base] support."

Breaux said that TI's regional network managers each monitor different aspects of the network. They require SNMP information that is segmented and filtered from portions of the network that do not pertain to them.

"We have higher level network management systems that can handle this, but we're not able to pass any of our IDNX-based management traffic onto those systems," Breaux said.

SNMP SUPPORT

Kramer said NET is developing SNMP support but declined to provide details. Until such support is available, Kramer noted, each SuperWAN domain must be managed independently, with separate NET network management platforms for each domain.

The new software does not have to be deployed on every IDNX in a network. It is required only on the gateway nodes that will separate one domain from another and on any WAN nodes whose traffic is intended to traverse other domains.

Available now, the software upgrade is free to NET's service contract customers.

✆NET: (415) 366-4400.

Egghead

Continued from page 1

ny's information infrastructure around Notes.

The firm's in-house Notes servers support hundreds of databases that hold everything from technical product information to human resources records. The software is also the basis for Egghead's sales force automation effort, Williams said.

That internal Notes system uses a T-1 net to connect to Egghead's regional centers and retail outlets. The company has also tied in a pair of customers to its Notes servers.

With Network Notes, access to the application will broaden considerably because users will reach the Notes servers via AT&T's frame relay network.

Egghead's initial plans call for trial links for 10 customers across the country, but Williams said the company ultimately wants to give access to thousands of customers.

Egghead does half its business with corporate and government purchasers, and one goal of the Network Notes project is to make their software purchases easier.

"The product that we are putting out on Network Notes is an electronic catalog of order entry/order status," Williams said.

Even though most of Egghead's customers are not currently Notes users, Williams believes that Notes is as close to a groupware standard as his company is likely to find.

The Network Notes trials could also help build momentum toward establishing Notes as an electronic commerce standard. Egghead, for example, already has a second, unnamed vendor that will join it in the trial, working off the same servers to connect to the same set of customers. No further details were available on that effort.

Network Notes bill takes shape

Monthly charges	
First user	$10-$12
Subsequent users	$5-$8
Connection fees	
Dial-up lines	$4-$8 an hour
Dedicated access (depending on line speed)	$500-$5,000 an hour

GRAPHIC BY TERRI MITCHELL

By offering Notes as a public data service, AT&T hopes to make application development easier for small to midsize firms, according to Dan Bove, director of marketing and distribution services for AT&T Public Data Services.

The service also lowers equipment and personnel costs because users do not have to buy servers to run Notes and hire management personnel to operate them, according to Bove.

And firms will be able to quickly set up electronic links to business partners.

"You could broaden the number of people who have access to your net more easily through the network-deployed system than through a premise-based system," he said.

AT&T has only come up with preliminary pricing on the service. Overall, the service should cost users between $500 and $1,000 per seat per year (see graphic, page 14).

The carrier is considering charging for each kilobyte transported, but no definitive pricing has been set as of yet, according to Bove.

OpenDoc

Continued from page 14

ODBC, which is a dog," said a database developer at a large chemical company.

ODBC and OLE, as well as most middleware technologies, also require separate software drivers for each front end and data source.

REUSABLE OBJECTS

OpenDoc database parts, which may be included in the box with a database or sold separately, could be dropped into custom applications, used in conjunction with commercial applications that support OpenDoc or customized by developers, sources said.

Like miniapplications, these parts would be designed to query or update databases. As with OLE, the parts could also be used in conjunction with other OpenDoc components, such as to update a spreadsheet as database information changes.

"It will probably be better than ODBC or OLE for database access, but as with any non-Microsoft technology, gaining market support is the real issue."

CI Labs will offer its own generic database query component for OpenDoc.

OpenDoc database components would initially reside on client machines, database vendors said, but could be stored on servers once distributed capabilities are added to OpenDoc in the first half of 1995. OpenDoc client code would be required to access the server-based components.

Apple will ship OpenDoc for Macintosh this quarter.

Oracle and Gupta have reportedly begun prototyping OpenDoc parts for their databases. Gupta said it has not committed to OpenDoc support but is considering it. Oracle declined to comment.

ACI US, Inc., a Cupertino, Calif., database vendor, said it is testing an OpenDoc part that would let users manipulate different data types stored in the company's 4th Dimension database.

Analysts said OpenDoc holds promise for database access. "It will probably work better than ODBC or OLE for database access, but as with any non-Microsoft technology, gaining market support is the real issue," said Judith Hurwitz, president of Hurwitz Consulting, Inc. in Watertown, Mass.

NETWORK WORLD

161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: $5.00 a copy; U.S. A $95 a year; Canada A $117.70 (including 7% GST, GST #126659952); Central & South America A $110 a year; Europe A $165 a year, all other countries A $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. to qualified management or professionals who meet ALL of the following criteria:
1) Have site purchasing influence.
2) Are involved in the purchase of network products and services.
3) Have multi-platform networks installed or planned (including network architectures, LAN operating systems and LAN environments).

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by Network World, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus 50 cents per page is paid to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

Copyright 1994 by Network World, Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.

Reprints (minimum 500 copies) and permission to reprint may be purchased from Reprint Services, 315 5th Ave. N.W., St. Paul, MN 55112 (612) 582-3800.

ISSN number: 0887-7661.

NETWORK WORLD TECHNICAL SEMINARS

Presents 2 Consecutive One-Day Seminars

TCP/IP:

Analyzing the Protocols of the Internet

TCP/IP, originally designed for research and development communications, has rapidly evolved into the standard for multivendor internetworking and Internet connectivity in business environments. This uniform communications platform requires network professionals to possess an in-depth understanding of the TCP/IP protocols in order to optimize their organization's systems integration and network flexibility.

This one-day, information-packed seminar, taught by Mark A. Miller, will examine the Internet protocols (TCP and IP) and the related Network and Transport Layer protocols (UDP, ICMP, ARP and RARP). Included will be an analysis of the operation of the Application protocols (TELNET, FTP and SMTP), plus the standard for internetwork management, SNMP. You will also explore the integration of TCP/IP into LAN operating systems and the migration of TCP/IP to the OSI protocol suite.

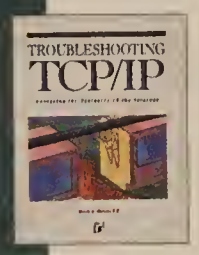
Throughout the seminar, the analysis of these protocols will be illustrated using the Sniffer® protocol analyzer from Network General. This seminar will go beyond the theory of these protocols to show you how they operate and demonstrate troubleshooting techniques to solve typical problems.

$395.00 REGISTRATION FEE INCLUDES

- Comprehensive seminar workbook
- Copy of Troubleshooting TCP/IP by Mark A. Miller
- Two exclusive protocol reference guides: TCP/IP and Ethernet
- Valuable course diskette containing reference documentation and standards for TCP/IP and related technologies
- Luncheon and break refreshments

Note: If you can't attend this seminar, a full attendee materials kit is available for just $99.95

Attending this seminar will help you . . .



- Understand the formats of TCP, IP, UDP, ICMP and others.
- Study the functions of the supporting protocols, such as ARP, RARP, DNS, BOOTP, RIP, and OSPF.
- Learn how the application protocols, such as TFTP, FTP, TELNET and SMTP are integrated into a TCP/IP environment.
- Learn how to analyze typical TCP/IP internetworking situations, such as incompatible frame formats, duplicate IP addresses, and TCP flow and sequence control operation.
- Study the various TCP processes, including connection establishment, sequence control, flow control and connection termination.
- Learn how TCP/IP is supported in various host and LAN operating systems.
- Understand how IP-based routing works.

Location	TCP/IP	SNMP
Boston	Sept. 19	20
Denver	Sept. 22	23
Los Angeles	Sept. 27	28
Chicago	Oct. 4	5
Dallas	Oct. 6	7
Wash., D.C.	Oct. 17	18
New York	Oct. 19	20
Atlanta	Nov. 1	2
Minneapolis	Nov. 3	4
San Francisco	Nov. 9	10
Wash., D.C.	Nov. 29	30

Official Sponsor
SynOptics

Internetwork Management:

Understanding SNMP and SNMPv2

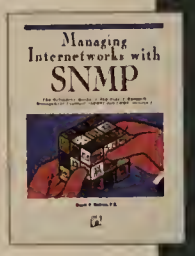
With the explosive growth of enterprise internetworks, the need for integrated network management systems to help simplify management operations has never been greater. Today's enterprise network management systems need to manage thousands of elements—from the hardware devices all the way to the applications and processes running on these networks.

SNMP (Simple Network Management Protocol) has become the de facto standard that holds the promise of enabling end-to-end enterprise network management. Implementing a network management system based on SNMP and SNMPv2 is a challenging task.

This one day, information-packed seminar, taught by Mark A. Miller, will help you understand the elements of an SNMP-based network management system, how to implement SNMP with your internetwork, plus the various enhancements such as the new message formats, improved error codes and security with SNMP version 2. In addition, you will learn how SNMP is being used to manage emerging broadband networks, including frame relay, SMDS and ATM.

Through the use of case studies, taken from live networks, and demonstrated with a Network General Sniffer® protocol analyzer, you will gain valuable insight broadband technologies such as frame relay, SMDS and ATM.

Attending this seminar will help you . . .



- Learn the details of the key elements of the Internet Network Management framework: the SMI, the MIB and the SNMP.
- Understand the Agent/Manager model of network management.
- Understand the enhancements found in SNMPv2, such as Manager-to-Manager communications, the GetBulk Protocol Data Unit and support for additional transport protocols including AppleTalk DDP, Novell IPX and ISO.
- Compare and contrast the ISO, IEEE, DMTF and Internet network management architectures.
- Study the security enhancements of SNMPv2 including authentication and encryption.
- Survey the key elements of Abstract Syntax Notation One (ASN.1), the language used to define SNMP message formats.
- Discover how SNMP can be implemented for WAN management, supporting broadband technologies such as frame relay, SMDS and ATM.

$395.00 REGISTRATION FEE INCLUDES

- Comprehensive seminar workbook
- Copy of Managing Internetworks with SNMP by Mark A. Miller
- Four exclusive protocol reference guides: SNMPv1, SNMPv2, RMON MIBs, Broadband MIBs
- Valuable course diskette containing reference documentation and standards for SNMP and related technologies
- Luncheon and break refreshments

Note: If you can't attend this seminar, a full attendee materials kit is available for just $99.95

Call 800-643-4668

Register today for the seminar nearest you!

Save $50 Attend Both Seminars For $740

Dial Our FAX-Back Information Line at 800-756-9430

for a complete seminar outline and registration form. When prompted, request document #55.

Back to Reality

IBM waves a management Karat; video vendors wave their own flag.

BY DAVID J. BUERGER

I don't know about you but I'm getting tired of hearing about network management products that do little more than monitor network screwups.

It's one thing to know when something breaks; fixing it is another. And that usually requires Joe Network Manager to leave his console-crammed war room and *go* to the trouble spot.

Often the biggest hassles are caused by glitches on one of the world's 170 million PCs, especially when it's part of a heterogeneous network. It's tough to diagnose PC problems because most are hidden from enterprise management platforms.

A slew of LAN management software vendors will read that and say, "Not with our product!" Trouble is, most require your network to be all Novell NetWare — and that just doesn't work in typical large environments.

What might work — possibly as soon as next year — is an emerging standard called the Desktop Management Interface from the Desktop Management Task Force. The DMTF has 75 formal members and 350 participating vendors.

Here's how the DMI will work. Vendors will embed software that complies with the spec in their products, such as LAN adapters, servers, printers, modems and applications. Service layer software running in the PC (using about 14K of memory) will pass operating information to a Management Information Format database, or MIF. That data is then passed to the management platform where applications allow net managers to monitor and manage the devices or applications.

Sounds simple. But does it work? Last week, vendors at the DMTF developers conference in Florida demonstrated more than 30 DMI-enabled products. Specs for PCs and adapters are finished, while work is proceeding on other committees.

The most impressive demo was IBM's, which showed SNMP-based NetView for Windows remotely managing a variety of PCs, adapters and operating systems.

IBM's secret weapon was the Karat Common Agent, which is PC-based software that feeds information from the MIF into a SNMP Management Information Base, or MIB.

The beauty of this outgrowth of IBM's Karat management strategy is that it allows any SNMP-based enterprise management platform to manage PCs and devices with DMI-enabled hardware and software applications. Very cool.

Unfortunately, IBM plans a March 1995 release of this agent software only for workstations running OS/2 or AIX. Vendors of other operating systems have pledged to fill in the gap by building DMI service layer software into their systems. IBM may release agents for other operating systems later in 1995. The firm also plans to build DMI into OS/2 and AIX.

Microsoft Corp. says its next release of Windows (Windows95) will include DMI support. But only time will tell if Windows95 will work with any enterprise manager.

Microsoft has a powerful incentive *not* to provide that interoperability because it will ship its long-promised Systems Management Server (SMS) — formerly called Hermes — late next month. SMS will contain its own service-layer implementation of the DMI.

IBM is missing a terrific opportunity to make Karat a true gem and deliver Karat Common Agents for DOS/Windows and Macintosh OS right away. You know how hard it is to deal with applications on different management platforms. A common standard would be a godsend.

PC see, PC do

The 100-plus vendors that are members of Intel Corp.'s desktop videoconferencing consortium last week proclaimed they are serious about making their bevy of budding products interoperate with each other and H.320-based group conferencing systems.

The Personal Conferencing Work Group demonstrated multipoint conferencing between PC-based and group systems. I like this technology, but one reader flogged me for pitching packet-based video on LANs. "Too bandwidth-intensive and hard to manage," he said. (That's why ATM vendors are licking their chops.)

Gartner Group apparently shares that reader's skepticism, claiming most desktop videoconferencing systems will be circuit-switched for at least the next 18 months. Gartner claims that only 5,000 desktop units are installed worldwide and projects that just 60,000 units will ship in 1995. (1996 is the year of "sea change," Gartner said.)

Pushing this technology is Intel's No. 2 priority, so expect lots of hype as you figure out how to manage yet another net on top of everything else.

ISDN update

NYNEX told me last week that in January it will roll out pervasive ISDN on Long Island and southern New York, much like Pacific Bell did in California. This will not be "pure" ISDN, however. Users without ISDN in their central office will receive the service from "foreign" switches, albeit at 56K instead of 64K bit/sec. NYNEX said it'll even throw in Intel ProShare videoconferencing for $1,000, almost $500 below its current street price.

Ya' know, I'm beginning to think this ISDN thing just might happen one of these years. . . .

Buerger is an industry consultant and contributing editor to *Network World*. E-mail your reactions to dbuerger@pipeline.com or call (516) 883-4944. Flames are welcome.

How to reach us

Call: (508) 875-6400
Fax: (508) 820-3467
Write: *Network World*, 161 Worcester Road, Framingham, Mass. 01701
Internet: network@world.std.com
MCIMail: 390-4868
Network Help Desk: Contact Dana Thorat by any of the means above or via the Internet at djt@world.std.com
Reader Advocacy Force: Leave us story tips or information about problems with products at (800) 622-1108, Ext. 487, or via the Internet at nwraf@world.std.com
BBS: Interact with other readers, download free software or leave story tips through our bulletin board system by dialing in at up to 9.6K bit/sec to (508) 620-1178 or (508) 620-1160.
Subscriptions: Contact the Circulation Department at our main address or drop a message through the Internet to nwcirc@world.std.com
Windows Connectivity Forum (sponsored by *Network World*): Type GO WINCON at any! prompt on CompuServe.
Reprints: Reprints are available in quantities of 500-10,000 by calling (612) 582-3800.

CyberSpeak

Voices from the reader network

How much interest do you have in deploying multimedia servers on your corporate network?

◆ "Multimedia is still a toy. It is fine for entertainment, training, home shopping, etc. [where attention spans are a problem]. It is not an enhancer of information. Perhaps there are some attention span problems in the boardrooms and mid-level management ranks, but no technology will solve that."

John Owens, director of telecommunications, a federal government agency, St. Louis

◆ "As an educator and a network administrator, I think multimedia servers are essential to my campus network. However, part of the ex-pense justification must include a commitment to developing quality multimedia applications — a time-consuming task, at best. At our college, faculty research and preparation time are often more scarce than financial resources. Multimedia will not serve higher education (or kindergarten through 12th grade) until it is readily available as a prepared supplement to traditional instructional materials."

Kirk Stephens, Southwestern Community College, Sylva, N.C.

◆ "I'm not too comfortable with the idea of running a media server on a network at this time. The technology is still somewhat of a novelty. I think multimedia can be very effective, because we just finished rolling out a piece for training, but we're not running the multimedia part over the network."

Carey Serif, manager of applied technology, Huntington Bancshares, Inc., Columbus, Ohio

◆ "Most of the vendors have just lightly touched the breadth and scope we need. It might be late '95 or early '96 plateau before it's practical."

Jim Lisiak, senior software engineer, Chevron Information Technology Co., San Ramon, Calif.

NextWeek
CyberSpeak Out!

IBM is boosting OS/2's network support. How will it fare against Windows NT and other competitors?

Responses due by 8 p.m. Thursday, Oct. 20. You'll get a T-shirt if we print your response. Please include your name, company and address.

The New Compaq LTE Elite. All The Features You Asked For. From The Difficult~

At Compaq, we always try to give you the notebook features you've asked for. Even if your requests do seem to stretch the laws of physics. Case in point: the Compaq LTE Elite.

To begin with, we actually found a way to get rid of that bulky AC adapter that you've always had to carry. We built the LTE Elite to have its own **built-in AC adapter,** so when you travel, all you need is a thin power cord.

At your request, we also designed it to be easily expanded. The LTE Elite gives you a choice of fast 486 processors (up to 75MHz) and a **removable hard disk.** It also has **PCMCIA** slots that let you use over 140 Compaq-tested cards. And almost every key component is **upgradeable:** the memory, the display and the processor itself.

We even designed the LTE Elite to make things easier in the office – with the SmartStation and MiniStation **expansion bases.** Both of these options feature built-in networking* and SCSI-2 capabilities for an instant desktop configuration – complete with ports for your full-sized monitor and keyboard. The SmartStation also adds expansion slots and bays, a spare battery charger and motorized docking.

Of course, the LTE Elite also provides the peace of mind that comes with the Compaq **three-year warranty**** and free **24-hour helpline.**

If you'd like complete information, you're invited to visit a nearby authorized Compaq reseller. Or, to receive LTE Elite specifications via fax, simply give us a call at 1-800-345-1518, choose the free PaqFax option and select document #4023.

With the LTE Elite, you'll find it's hard to make a wrong decision. If not impossible.

COMPAQ

© 1994 Compaq Computer Corporation. All rights reserved. Compaq and LTE registered U.S. Patent and Trademark Office. Elite, SmartStation and MiniStation are trademarks and PaqFax is a service mark of Compaq Computer Corporation. *SmartStation includes built-in Ethernet capabilities; MiniStation is available in Ethernet or Token-Ring models. **Certain restrictions and exclusions may apply. Monitors, battery packs and certain options are covered by a one-year warranty. The intel inside logo is a registered trademark of Intel Corporation.

~To The Impossible.

Every internetworking decision means going out on a limb. The trick is making sure it's attached to the right tree.

We understand the position you're in. You need to build an internetwork that links an entire organization today while accommodating rapid growth and new technologies down the road. At Wellfleet, our family of internetworking products and multiservice WAN switches are the key to building your highly available, high-performance backbone network and to connecting your remote offices. And our worldwide support is at your side 24 x 7 x 365. A comforting thought when you're out on a limb. Call us at 1-800-989-1214, extension 37.

© 1994 Wellfleet Communications, Inc.

WELLFLEET